The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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The Chemist in Industry

A CORRESPONDENT who is much interested in our suggestion last week that industry should be systematically educated as to the advantages of utilising chemistry more fully invites us to follow the subject up by suggesting how this work should be done and who should undertake it. There are many bodies which might assist and which to a certain degree are already indirectly engaged in such work. Our point was that none of them had undertaken any specific propaganda, and that the present moment, when numbers of academically qualified chemists are vainly seeking appointments in industry, is appropriate for considering some definite plan. As an example of what might be done, let us take the Society of Chemical Industry, the largest of the chemical societies, one with a very complete organisation throughout the country and with a considerable income, both from subscriptions and from endowments. Though a body of scientists in the best sense, its primary mission is the application of the science of chemistry to industry. The education of industry in the value of chemistry falls directly, therefore, within its scope. To put a very direct question, what has the Society specifically done since the last Annual Meeting until to-day to induce any industry or any firms to introduce a larger chemical service, and so extend the field of employment for chemists? If the answer is "Nothing," it will not, we hope, be taken as unfriendly criticism; but it is necessary at the outset to get the facts clear. If it is decided to begin to do something—to venture at least on a serious effort—then we may start to consider some plan of action.

The first point is whether the Council has sufficient enthusiasm to attempt a work for which there is no precedent or to organise some committee of practical men with the necessary gifts. If either is possible, the next step would be the selection of certain industries and a vigorous research into the part which chemistry plays in all their operations from production to salesmanship. Such research would naturally have to be prosecuted through the local sections, which are or should be closely connected with the industries of their various districts. Six months of honest public-spirited work in this direction, vigorously directed from headquarters and loyally supported by local sections, would bring together a mass of data which in itself would be of great value and interest. And on the basis of such evidence it would surely be possible to find in several industries fruitful ground for additional chemical service. It is not to be assumed that the industries affected would instantly respond. They would need to be educated by conference, by literature, and by other means, but that would be the finest sort of work that the Society could undertake, and it would attract to itself increasing confidence and support. There are two attitudes to be taken up towards this and every other suggestion for moving forward. The one is a serious effort to get something done. Even if it failed it would be a creditable failure. The other is the comfortable policy of just letting things alone—why bother? This is simply the difference between progress and stagnation.

The favourable way in which such effort reacts upon the bodies who make it is illustrated in a note in the current issue of *Chemical and Metallurgical Engineering* by a writer who has been inquiring into the local activities of certain sections of the American Chemical Society. In the course of these inquiries he discovered at Indianapolis the chemists as a group playing a leading rôle in local affairs. For years, he states, it had been the custom of that section to hold weekly luncheons—and, contrary to general experience, these were unusually well attended. Formerly they were concerned almost entirely with subjects of interest only to chemists, but of late problems of a broader and more general significance had been considered. As a result the laymen and the newspapers of Indianapolis had come to look to the section for an expression of opinion, not alone on matters chemical but on many local issues of professional and public interest. Thus zealous promoters of schemes for obtaining "wealth from the air" or for solving the nation's motor-fuel problem with Indiana lignite had sometimes suddenly

found themselves confronted by a little investigating committee of Indianapolis chemists. Somehow or other these men had a reputation for getting at the bottom of things very quickly and usually it was the people of the community who benefited. It is activities of this kind which help to link up chemistry with public interests and in that way convince industrialists of its commercial value.

Synthetic Ammonia Developments

THE promoters of the synthetic nitrogen schemes in this country are particularly reticent, and it is very difficult to obtain anything more than the most meagre details of their intentions. In his speech at the second annual meeting of the British Sulphate of Ammonia Federation (a report of which was given in our last issue), Mr. Milne Watson repeated what probably a good many already knew—namely, that Synthetic Ammonia and Nitrates, Ltd., had been running a small synthetic plant for over a year now; but it will probably be news to many that the Billingham plant is confidently expected to reach the producing stage within the next six months or so. The small plant referred to is, no doubt, that which was known to have been in operation at Runcorn; the unit having a capacity of one ton of ammonia (*i.e.*, four tons of sulphate of ammonia) per day. According to Mr. Watson, the output at Billingham will be on a comparatively small scale to start with, the extent of production in the future depending upon whether or not conditions are found to be favourable. It is understood, however, that the plans for Billingham which were finally approved were of a most elaborate and extensive nature. In fact, so far as subsidiary apparatus is concerned, our information some time ago was to the effect that eventually no fewer than 24 water gas and producer gas generators, each with a capacity of 90,000 cubic feet per hour, would be laid down; and one gathered from the fact that these generators were to be fitted with all the latest improvements, such as self-clinkering grates and hydraulically operated valve gear, that unusual pains were being taken to eliminate labour as far as possible. It was said some time ago that the gross output which the promoters of the Billingham scheme had in view was of the order of a quarter of a million tons of sulphate of ammonia annually, but that for the present only one-sixth of the complete unit would be proceeded with. If this intention still holds good, therefore, it looks as though we shall soon find some 40,000 additional tons per annum of sulphate of ammonia on the market in this country. This amount is by no means insignificant when it is recalled that it represents nearly one-tenth of the present total production in Great Britain.

By-product ammonia producers have, however, no little cause to congratulate themselves upon the decision of Synthetic Ammonia and Nitrates, Ltd., to join the Sulphate of Ammonia Federation. We have heard so much irresponsible talk about price-cutting campaigns when once the synthetic salt came on to the market that it is a relief to have evidence of the intention of both sides to pull together. With Germany needing all the nitrogen she can produce there is not much fear of her affecting the British manufacturer for at least some years to come; and the fact that the synthetic interests in this country have seen fit to join the Federation so early promises well for future good relations between all classes of producers.

Dr. Weyman's New Book

OUR readers will, no doubt, have seen the announcement that Dr. Geoffrey Weyman's book on *Modern Gasworks Chemistry* is now ready. This is one of the first three volumes of Benn Brothers' "Gas and Fuel" series—a series which will eventually include about a dozen books, all of which, it is hoped, will be issued within the next twelve months. The series has, we understand, been "fathered" by Mr. Alwyne Meade, who has kept in mind that with so diverse an industry as that associated with gasmaking and coal carbonisation it is impossible to cover the whole field in a broad treatise such as his *Modern Gasworks Practice*. In order, therefore, that the gas engineer (who, by the way, is essentially a chemical engineer) may be provided with really up-to-date and detailed information on all of his many "side-lines" it is imperative that he should be supplied with authoritative works dealing specifically with ancillary subjects. Dr. Weyman confines himself in the main to the activities of the gasworks laboratory; but a glance through his chapter headings indicates that the gasworks chemist cannot by any means rest satisfied with a mere knowledge of analytical chemistry applied to his own particular industrial process. It would seem, in fact, that he must be equipped with a fairly deep knowledge of such things as the analysis of all kinds of fuel, refractory and insulating materials, boiler feed water, and lubricants.

We do not intend to anticipate anything which our reviewer may have to say about this book; but, as a matter of interest to chemists in general, attention may be drawn to the remarks which the author makes in his decidedly unconventional introduction. Dr. Weyman possibly speaks from experience of his own early years, when he alludes to the unsatisfactory position in which a works chemist, frequently engaged and controlled by those who possess only commercial qualifications, is likely to find himself. Often enough he is superimposed upon an existing organisation, and without definite position or authority is expected to show substantial increases in economy. To the qualifications of training and ordered knowledge must, therefore, be added that of tact. It is to be hoped that the day has gone for good when the chemist was variously regarded as a nuisance, a necessary evil to be tolerated, or a species of detective in charge of instruments and apparatus the main function of which was supposed to be that of bringing to light the shortcomings of others. To-day the chemist has won for himself a far more significant place in industry, and he can trust to the result of his efforts to make his position one of reference by both manager and workman, and his laboratory the nerve centre of the works.

Defending the Professional Chemist

FROM an account in the current issue of the Journal, the Institute of Chemistry has been conducting a spirited correspondence with the Ministry of Agriculture

respecting the practice of allowing colleges "to undertake investigations and analyses for merely nominal fees at the expense of public funds intended for educational purposes." The Institute's complaint is that the system has been introduced for the benefit of a particular class well able to afford reasonable fees and has operated to the serious detriment of chemists. While the Ministry has regarded the provision of facilities for cheap analysis as an educational measure, the Council have held that the practice of agricultural chemistry has been thereby discouraged owing to the private practitioner finding it impossible to compete with State-aided institutions. The colleges, it is complained, have even aggravated the situation by continuing to advertise scales of fees, a practice, in the Institute's opinion, contrary to the accepted etiquette of the profession, and in several cases certificates of colleges have been produced in courts of law in direct contravention of the stipulation, distinctly laid down, that such certificates should not be so used. In the end the Institute failed to secure from the Ministry anything more substantial than a polite expression of anxiety to do whatever is possible to remove any legitimate cause of complaint which private practitioners of chemistry may have in this direction. Nevertheless its action may have a useful effect in reminding public authorities of the existence of private rights, and in any case will be appreciated by all who wish to see such rights protected against undue official encroachment.

The "Chemical Age" Year Book

IT is satisfactory to be able to announce so early that complete success has attended our proposal to publish a "Chemical Age Year Book and Diary for 1923." This interesting volume, the first of an annual series, will be ready for issue about the end of the year, and will, it may safely be predicted, soon be familiar on the desk of every chemical manufacturer and merchant. The welcome it has received is indicated by the fact that it will carry over 120 pages of trade announcements—a larger volume of chemical and allied advertisements than has ever before, we believe, appeared in any English publication concerned with chemical industry. The editorial matter, compiled by technical and commercial experts, will cover about 40 pages; there will be a comprehensive commercial directory and buyers' guide, and, finally, there will be a convenient diary for engagements and other memoranda. The volume will be issued free to subscribers to THE CHEMICAL AGE, and sold to non-subscribers at 10s. 6d.

Our readers may also be interested in a preliminary announcement respecting our Annual Review Number, to be published on December 30. The three previous issues succeeded in doing what no other chemical journal had attempted—namely, in giving a responsible review compiled by well-known writers, of the principal chemical developments of the year. This year's issue, it is hoped, will be even more complete. The special articles will cover the progress made in such fields as nitrogen fixation, dyestuffs manufacture, chemical engineering, heavy acids and alkalis, invention, etc., while the operations of the leading chemical societies and associations will be concisely described. In this case, again, the commercial community have recognised the value of this number, and the trade announcements promise to establish a new record.

Points from Our News Pages

Further impressions of his visit to the U.S.A. are given by Mr. F. E. Hamer (p. 782).

The ethics of expert evidence were discussed by Mr. F. W. Richardson at a meeting of the Leeds Section of the Institute of Chemistry (p. 784).

Unity and co-operation in chemistry was the keynote of the speeches at the fourth annual dinner of the Chemical Industry Club (p. 785).

A complaint that sodium phosphate has been improperly included in the list of dutiable articles under the Safeguarding of Industries Act was heard on November 25 by the Referee, who reserved his decision (p. 786).

Scotland's contribution to chemistry was the subject of an interesting lecture in Edinburgh by Dr. J. C. Irvine (p. 788).

Professor Ling describes some interesting experiments on the estimation of starch in barley and wheat (p. 790).

The chemical trade this week is described in our London Market Report as rather on the quiet side, with orders in the main for small quantities. Export business is more active, with a fair volume of inquiry (p. 799).

A slight business improvement with fairly steady prices is recorded in our Scottish Market Report (p. 801).

Books Received

OXIDATIONS AND REDUCTIONS IN THE ANIMAL BODY. By H. D. Dakin. London: Longmans, Green and Co. pp. 176. 6s.

THE INDUSTRIAL APPLICATIONS OF X-RAYS. By P. H. S. Kempton. London: Sir Isaac Pitman and Sons, Ltd. Pp. 110. 2s. 6d.

CHEMICALS AND ALLIED PRODUCTS, 1919 AND 1920. Canada: Dominion Bureau of Statistics, Mining, Metallurgical and Chemical Branch. Pp. 150.

TABLES ANNUELLES DE CONSTANTS ET DONNEES NUMERIQUES DE CHIMIE, DE PHYSIQUE ET DE TECHNOLOGIE. Vol. IV. Paris: Gauthier Villars et Cie. Cambridge: University Press. Pp. 1,377.

The Calendar

Dec.		
4	Royal Society of Arts: "Brown Coal and Lignites." W. A. Bone. 8 p.m.	John Street, Adelphi, W.C.2.
4	Society of Chemical Industry: "The Valuation of Insoluble Phosphate by Means of a Modified Citric Acid Test." G. S. Robertson and F. Dickinson. 8 p.m.	Engineer's Club, 39, Coventry Street, W.1.
5	Institute of Metals (Birmingham Section). R. J. Redding, 7 p.m.	Chamber of Commerce, New Street.
6	Society of Public Analysts. Ordinary Meeting. 8 p.m.	Burlington House, Piccadilly, W.1.
7	Chemical Society. Ordinary Scientific Meeting. 8 p.m.	Burlington House, Piccadilly, W.1.
7	Royal Society: Papers by Lord Rayleigh, G. H. Henderson and others.	London.
8	Institute of Metals (Sheffield Section). "Cobalt." W. R. Barclay.	Mappin Hall of the University of Sheffield.
8	West Cumberland Association of Chemists, Chemical and Metallurgical Engineers: "Some Theoretical Aspects of the Manufacture of Sulphuric Acid." C. Irwin.	Workington.
9	The Mining Institute of Scotland: General Meeting.	Glasgow.
9	The West Yorkshire Metallurgical Society: C. R. Groves. 6. 30 p.m.	Technical College, Halifax.

"Chemical Age" Letters from America.—IV.

Impressions of Washington—The Work of the A.C.S.—An Evening among Government Chemists

Cosmos Club, Washington.

THE three days I spent at Washington were among the very pleasantest of the tour—as pleasant, in fact, as any three one's memory can recall. Washington is a beautiful city, with all the atmosphere and qualities of a capital. The Government and public buildings have an unfailing dignity about them; the best quarter of the city, where the foreign embassies and the residences of notable people like Woodrow Wilson are situate, compares not unfavourably with the best in London; the national memorials—the Lincoln monument and the Arlington Cemetery, for example—are noble in conception, and have been set in perfect surroundings; the broad tree-lined streets are admirably laid out, and the monuments one meets with so frequently show that if the American has a short history, he has one full of incident, and one which engages his national imagination and pride; and finally, the large proportion of coloured folk carries one back to the conditions in which the English settlers laid the foundations of their great country. I had contemplated a flying visit of a few hours, but yielded to the persuasive appeal of Dr. Charles Parsons to make it three days. I cannot be grateful enough to him for the friendly pressure which prevailed, nor to his colleague, Mr. H. E. Howe, the editor of *The Journal of Industrial and Engineering Chemistry*, and to my more immediate newspaper colleagues, Mr. H. C. Parmelee, editor of *Chemical and Metallurgical Engineering*, and Mr. R. S. McBride, the Washington representative of the latter journal, for their endless pains and kindness in showing me about.

THOSE WHO WILL ATTEND THE DINNER TO BE GIVEN TO F. E. HAMER AT THE COSMOS CLUB, WASHINGTON, MONDAY EVENING

October 16 at 6:30 o'clock.

W. F. Hillebrand, Chief Chemist, Bureau of Standards.
L. I. Shaw, Assistant Chief Chemist Bureau of Mines.
W. W. Skinner, Chief of Bureau of Chemistry, Dept. of Agriculture.
Arthur L. Day, Director Geophysical Laboratory.
F. G. Cottrell, Director Fixed Nitrogen Laboratory.
E. W. Washburn, Chemical Division National Research Council.
H. C. Parmelee, Editor, "Chemical and Metallurgical Engineering."
C. R. de Long, Chemical Adviser Department of Commerce.
W. F. Keehan, Washington Representative Chemical Foundation.
F. S. Dickson, Director Chemical Division, Treasury Department.
C. L. Parsons, Secretary American Chemical Society.
H. E. Howe, Editor, "Journal of Industrial and Engineering Chemistry".
E. E. Slosson, Director Science Service.
General Amos A. Fries, Director Chemical Warfare Service.
W. D. Bigelow, Chief National Canners Association.
W. M. Clarke, Chief Chemist Hygienic Laboratory Public Health Service.

My quarters were at the Cosmos Club, formerly the residence of Dolly Madison, widow of President Madison, and a recognised meeting-place at one time of political notabilities. There are three clubs in Washington—the Cosmos, all brains and no money; the Union (I think that's the name), all money and no brains; and the University, neither money nor brains. Hence my location at the Cosmos. The Cosmos mainly consists of men of science and letters—the former preponderating—and membership is limited to those who have really done something in one or other of these fields. I did not stop to inquire what particular achievement in science it was that justified my temporary admission: it was enough to find oneself so cordially welcomed into its cultivated and restful atmosphere. Here, it need scarcely be added, the large community of chemists and other scientists who are engaged in the various Government services find a common meeting ground and have ample opportunity for social and scientific intercourse.

A Night Ride

I had scarcely finished dinner after the journey of six hours or so from New York before Dr. Parsons made his appearance, and proposed a look round the city in the evening. This I innocently interpreted as a stroll in slippers in the neighbourhood of the White House; but that is not Parsons' way. Within three minutes we were gliding away in a high-powered car, and when at the end of about an hour and a half we pulled up again at the Club entrance, we had made a complete tour of the city and its suburbs; we had intersected it at what appeared to me innumerable points with an ease and skill which no London taxi-driver could have excelled, and I had been entertained with a vivid description of the city and its organisation, with something thrown in about the splendid work of the A.C.S., about which its secretary is never silent for very long, though he knows exactly when to drop the right word in its appropriate season. If Parsons handles his committees, sections, and members as adroitly as he handles his car, the A.C.S. must be blessed in its secretary, and from what I heard of his activities, I should say it is. I ventured to allude distantly to the speed at which we had taken some corners. On this point, Parsons takes up a rather frosty attitude. He insists on regarding himself as a particularly safe and conservative driver, and though his friends have views on this subject, they have long ceased to challenge his claim. Anyhow, this evening tour of Washington made a very pleasant first night out.

Some Notes and Comparisons

Next morning at 9 a.m., Mr. Howe was at the Club with *his* car—everybody, of course, has his car in the States—and away we went for a morning's run to Mount Vernon, the home of George Washington, overlooking the Potomac River. As becomes a literary man, Mr. Howe is content with something a little more leisurely than sixty miles an hour, and on the way through the woodland country, with its rapidly deepening tints, one had an opportunity of comparing notes about conditions in our respective countries. I could find no trace among our American friends of the little cliques and undercurrents of which one hears so much at home. They think primarily of chemistry as a whole, as a national asset, and they welcome as fellow-workers all who assist in its promotion. The result is that chemistry stands out as something large and important before the national eye, and all the agencies concerned with it gain in proportion. Moreover, the idea of "service" is as prominent here as in private industry. The justification of the A.C.S., of the Government bureaux, and of all the rest is the service they render to the nation; whereas at home it seems to be assumed that the public's first concern is to keep certain little organisations going. In the States the organisations and the businesses which succeed most are those which give the best service. The machinery exists merely to serve a cause, instead of the cause being exploited to maintain the machinery. And there is a world of difference between the two attitudes.

It was pleasant to hear from Mr. Howe of the healthy condition of the Society's publications. The three journals are published at different centres, and the scheme, I was told, worked well. "We have such a large area to cover," said Mr. Howe, "that the policy of decentralisation helps to keep the Society in more direct touch with members than would be possible if we all worked from one centre." Even in Washington the offices of the *Journal* are distinct from the offices of the Society, but though separated in this way, the officials appear to work very happily together, and with perfect understanding. We exchanged opinions frankly about the relations between official and non-official publications, and recognised that though differing in character they both served the same cause in their respective ways. In a letter received later, Mr. Howe put the position so well that I take leave to quote one passage:

"While your publication would be classed as a business paper, and ours is owned by the Society, still we have the same objects in view, and now that we have had a chance to discuss some things together, I hope we can continue to keep in step, and each call upon the other for such assistance as he may be able to render in promoting chemistry as a profession and an industry."

A passage, I think, very well worth quoting for the good judgment and good feeling which it breathes! It would indeed require a cantankerous mind to be unable to work amicably on such a friendly basis.

An Evening Among the Chemists

I must skip much of interest in our morning's excursion in order to come to the pleasant surprise which awaited me in the evening. This was a dinner at the Club, which Dr. Parsons and Mr. Howe had jointly arranged, and at which the heads of several of the Government bureaux were present to meet me. A visit to the dentist had unfortunately restricted Dr. Parsons' normal flow of speech, and Mr. Howe accordingly took the chair. I was indebted to him for introducing me in the capacity of a newspaper man, and putting me thus at ease with the group of distinguished scientists whose names appear on the slip reproduced on page 782. One need, however, have had no fears, for the American scientist and Government official has none of the exclusiveness affected by some of our eminent vanity-bags at home, and has the intelligence to see something of the bearing of their own scientific work on the public welfare. At any rate, they listened with the kindliest interest to a casual discourse on some of the more public and political aspects of British chemical industry.

"Instead of addressing this distinguished gathering of American scientists," I told them, "I should be much better employed in listening to all you could tell me of the wonderful organisation which has been built up here in the heart of your capital for the prosecution of research under the auspices of the State. We have indeed some valuable centres of public research in England, where excellent work is being done, and the recently established Department of Scientific and Industrial Research is gradually extending its operations, but from what I have seen in one day I should say that, compared with you, we are miles behind; in fact, may almost be described as only playing with the subject. Not only is your organisation on a vastly larger scale, but what impresses one is your admirable arrangement for making the results of your work as widely known as possible. Periodically, we receive from such bodies as the Bureau of Mines papers of the highest value to industry, placed gratuitously at our service, and the same practice, I am told, is followed in all your departments. What a contrast this is with the policy of some of our English societies, who actually stipulate when a paper is read on some subject of national importance that no one is allowed to publish more than 10 per cent. of its contents. And what a comic touch is imparted to the position when the very people responsible for the practice indulge in lamentation over the public indifference to the profession and industry of chemistry. It recalls a letter which I once received from Lord Northcliffe when newspaper men were fighting for justice under the Defence of the Realm Regulations, and the opening sentence of which was: 'We in England do not understand the meaning of publicity.' It is refreshing to find the open-minded attitude which characterises American public and business life; the willingness among you scientists as among your business men to pool knowledge and experience; the positive policy of working for the advancement of all instead of the negative dog-in-the-manger policy of obstructing everyone else. We are, however, moving a little. This policy of suppression is gradually becoming discredited, and the wonderful success of the Association of British Chemical Manufacturers—the real centre of chemical industry in England—is largely explained by the substitution of the co-operative for the exclusive spirit in business organisation."

A short examination of the dyestuffs controversy led to some questions as to why, with its excellent publicity service, America should have lost the embargo, while England, with very indifferent official publicity, had kept faith with the industry. The obvious retort was that we were politically more honest, but that only excited laughter, and one had to confess that the result in England was largely a favourable political accident. The Coalition Ministry, faulty as in many respects it was, had succeeded in hanging together, and my prediction was that the general election would not return any Party opposed to the Act strong enough to repeal it.

In this way, the discussion gradually ranged over the whole field—the future of the chemical industry of both countries, the dyestuffs and fine chemicals situation, the state of the chemical trade, the future of the British Dyestuffs Corporation, and the big work Sir William Alexander had undertaken, the American attitude towards Europe, and the growing solidarity of the English-speaking race on both sides the Atlantic—until the evening was gone all too soon. One after another took part in the discussion, and the last remark I remember was one by Mr. Slosson, who has made a real hit with his volume, *Creative Chemistry*, and who serves chemical interests so well with his articles in the periodical press. An almost silent member throughout the evening, he expressed his pleasure at listening to the discussion, and finally remarked that it ought to be worth at least fifty dollars of copy.

F. E. HAMER.

"Conversion Tables"

To the Editor of THE CHEMICAL AGE.

SIR,—We are extremely obliged to you for the notice which you have given to the book of "Conversion Tables for the Oil and Chemical Trades," which has appeared in the current issue of THE CHEMICAL AGE. As a result of this notice we have already received several inquiries for copies of this book from various readers of THE CHEMICAL AGE.—Yours etc.,

FOR MAJOR AND CO., LTD.,
L. N. RAWES.

Sculcoates, Hull.
November 29.

"Overcrowding"

To the Editor of THE CHEMICAL AGE.

SIR,—With reference to the discussion in your pages on the overcrowding of the chemical profession may I be permitted to suggest that the main cause of this state of affairs is the too specialised teaching of science in the newer universities?

In the older universities the training in science is chiefly of a general and fundamental nature, fitting the student for any branch of science or other activity where opportunity offers. In the newer universities the aim seems rather to be the production of a trained practitioner of one particular art or science. Thus, if a student wishes to take metallurgy he is taught all manner of things about the actual practice of that art, often to the neglect of the great, underlying principles of all science; while a man trained generally in those great principles is not confined to any one branch or art because the same old laws and methods underlie all reasonable human endeavour.

In a nut-shell, are not the younger universities making the mistake of aiming at technical proficients of limited adaptability instead of striving to educate scientists?—I am, Sir, Yours, etc.,

REGINALD G. JOHNSTON.
Scientist-in-charge.

Midland Laboratory Guild Ltd.,
Broad Street, Birmingham.
November 27th, 1922.

The Mechanism of Dust Explosions

To the Editor of THE CHEMICAL AGE.

SIR,—We have been very much interested in reading the editorial note on "The Mechanism of Dust Explosions" in THE CHEMICAL AGE, issue of September 30, 1922.

This Bureau is, at the present time, conducting research investigations relating to determination of the causes of industrial plant dust explosions and the development of effective control methods. We are forwarding, under separate cover, a set of publications issued by this Department on the subject (as per copy of list attached hereto), in which we thought you might be interested. We are also enclosing a list of articles on the subject which have appeared in some of the technical and trade papers and contain the results of investigations of explosions in a wide range of industrial plants The losses of life and property have been very great as a result

of these industrial plant dust explosions, and the subject is commanding considerable attention at the present time in this country.

The enclosed leaflet announces the publication of the new book on the subject "Dust Explosions," which is the first contribution in book form and relates to the causes that have been established in these investigations and the development of effective control methods.

We have been in very close touch with the valuable work done by Professor Wheeler and others and would be very pleased indeed to co-operate with you in bringing the results of this work before your industrial plants.—Yours, etc.,

D. J. PRICE,
Engineer-in-Charge of Development Work.

Bureau of Chemistry,
Washington, D.C.
November 14, 1922.

[Needless to say, we shall be delighted to assist in making known the excellent work of the Bureau of Chemistry in this or any other direction.—ED., *C.A.*]

"Chemistry and Chemists"

To the Editor of THE CHEMICAL AGE.

SIR,—The inadequate recognition of chemists is in a large measure their own fault, since they alone are responsible for the strange guise of chemical theories. To one brought up to a trade the tricks thereof cause no amazement; a profession should have a stricter standard of integrity of statement.

Statements that a crab is a red animal that walks backwards and that a dissolved substance exerts the same pressure as if gassified are of like veracity and utility. If you do not believe them and know the right answer they do no direct harm. Imagine an engineer accepting the "gas law" as scientifically true for solutions. The data are sufficient for designing a plant to crystallise salt from brine without any evaporation by using the well-known property of a gas becoming denser by its own weight in a vertical column.

In the propaganda literature advocating the "gas law" the occasional equality of the gas constant with the osmotic constant is greatly emphasised. Turning to an engineering handbook (say, Marks, page 315), the gas constant appears as the difference of the specific heats at constant pressure and constant volume per molecular weight. There is no physical counterpart in a solution to specific heat at constant pressure; in other words, the theory is only fit for use by those knowing it devoid of any bigoted connection with objective reality.

Within the profession some consider the theory as true for the very lowest concentrations. Baker's recent work shows the effect of extraordinarily low concentration of water in lowering the boiling point. Calculated by the accepted rules the molecular weight of water freshly dissolved has an enormous negative value; on standing this value increases gradually to a final still larger negative value. Perhaps the sign comes wrong because the theory starts by equating the osmotic suction to a positive pressure; calling a suction a pressure is not enough to make it change sign.

These distracting simulacra of partial verities are commonly held up to students as scientific truths, and not as merely statements with particular implications for a special class of men. The chemist thus tends to acquire a habit of mind and expression in dissonance with his fellow men, scientific or in positions of authority.—Yours, etc.,

E. F. MORRIS.

4, Albert Square, Manchester.
November 22, 1922.

P.S.—A description of a chemical engineer suggests itself as a man knowing that modern chemical theories are mechanically unsound.

Chemical Warfare Resolutions

A COMMISSION composed of representatives of the United States, the British Empire, France, Italy, and Japan will meet at The Hague on December 11, to consider possible changes which may have been rendered necessary in the laws of war by the introduction or development of new agencies of warfare since The Hague Conference of 1907. The resolutions or declarations relating to the use of noxious gases or chemicals which have already been adopted will not be reviewed.

Chemists and the Law

Ethics of Expert Evidence

THE annual meeting of the Leeds area section of the Institute of Chemistry was held at the Queen's Hotel, Leeds, on November 22, Mr. W. McD. Mackey (chairman) presiding. After the routine business of the meeting had been conducted, Mr. F. W. Richardson read a paper on the "Ethics of Expert Evidence."

Mr. Richardson said it was scarcely necessary to remind his professional brethren of the low estimate in which much expert evidence was held, particularly by the legal profession, and what was more important, judges and magistrates. There was, however, never smoke without a fire, and the disrepute had some reason for its existence.

Food and Drugs Act

Dealing with the wording of reports, he said that the public analyst should not allow himself to be one-sided and be led away by a bias to help in securing a conviction. It was certain that some health authorities and officials, also the police were frequently victims of the will to prosecute, and that magistrates were overwhelmed by the momentum to convict, possibly in some cases as a species of auto-suggestion; for example, the defendant must be guilty in some measure or he would never have been prosecuted. On the other hand, he was glad to say that he has lived to see a great change for the better in the attitude of the authorities towards violations of the Food and Drugs Act.

An Analyst's Advice

Several years ago he analysed a sample of butter which was deficient in fats. In his report he suggested that either the cows were abnormal or fed abnormally, and requested that samples of the milk should be forwarded. His report was returned with the remark that it was not for the prosecution to suggest a line of defence. In court the defence proved that the deficiency in fats was due to excessive feeding on cottonseed cake. Here innocent persons were put on trial and an analyst lost some of his repute by the refusal of the prosecution to accept his advice. He argued that whole-time public analysts are more or less at the mercy of the Health Committee, or what was sometimes worse, the Medical Officer of Health, who recommended that the public analyst should act in a judicial capacity between the Health Committee and the offender.

Unprofessional Conduct

Continuing, Mr. Richardson said it was a deplorable fact that when a prosecution was instituted in some clear case of fraud the defendant had no difficulty in getting all the expert help he required, at the usually high fees. It was not for him to suggest that because professional chemists happened to be friends they should never appear on opposite sides. Even when the defendant's chemist found the plaintiff's analysis to be correct he might be of use as an adviser in court, either in mitigation or even in explanation—it was all a question of ethical fairness. His complaint was, that however glaring the adulteration, if the firm was large enough and wealthy enough, there always appeared an opposition array of leading chemists. Some of these experts, whilst admitting the accuracy of the prosecution's data, attempted to befog the issue by raising purely subsidiary questions by inuendoes and assertions. Personally he resented this form of jugglery, which at times served to cast dust in the eyes of the magistrate. He wondered how many of the experts of this class would care to face a jury of trained chemists.

A Permanent Tribunal

In conclusion the author said they needed a special committee of the Institute of Chemistry appointed by the whole of the members throughout the country as a permanent tribunal, to deal with cases of unprofessional conduct. His plea for expert evidence was based upon the oath, "the truth, the whole truth and nothing but the truth," and that members of the same profession should cease all attempts to score off one another, to gain professional "kudos," at the cost of another's reputation. Let them play the game.

A lengthy discussion followed, in which the chairman, Captain Foster, Messrs. Burrell, Grinling, E. Read, the hon. sec. and others took part.

Chemical Industry Club Annual Dinner

Appeals for Unity and Co-operation

THE fourth annual dinner of the Club was held at the Connaught Rooms, London, on Friday, November 24, Mr. A. G. Craig presiding. The principal guest was Lord Riddell, and there were also present as guests Dr. T. Duggan, of the Chemists' Club, New York; Sir Max Muspratt, Bart; Mr. A. Chaston Chapman, representing the Institute of Chemistry; Mr. P. A. Ellis Richards, representing the Society of Public Analysts; Mr. J. A. Reavell, representing the Chemical Engineering Group of the Society of Chemical Industry; Mr. S. H. Burford, of the Nottingham Section of the Society of Chemical Industry; Mr. Roscoe Brunner and Mr. J. A. D. Mackey, Master of the Tallow Chandlers Co.

Lord Riddell

Lord RIDDELL, in proposing "The Profession and Industry of Chemistry," said he had no doubt been asked to propose the toast because he knew less about chemistry than anyone present, but during the dinner he had taken the opportunity to put a few questions to the chemical pundits who sat on his right and on his left, and he gathered from them two things, first, that the position of the chemical trade now was much superior to what it was before the war, and secondly, that the chemical trade was one of those businesses in which there was very little money (laughter). However, he discounted the latter statement because he very often went to trade dinners, and he always heard the same story. Therefore, he was not surprised to hear that while the chemical industry was doing well in a way it was doing badly financially. He knew sufficient of chemistry to know that British chemistry had a glorious tradition. It was the custom here to run our own country down and to run other countries up. But ours was the best and the most glorious country in the world, because if they took the trouble to investigate they would find that almost every great discovery of importance during the past 50 years had been made by a Briton. He was glad to learn that greater unity was now prevailing in the chemical industry, and he hoped that that would lead to greater exports, because it was needless to say that the future of our country depended upon our export trade.

Professor F. G. DONNAN, made a humorous reply to the toast.

Mr. Roscoe Brunner

Mr. ROSCOE BRUNNER, who also responded, said that he had that morning presided at a meeting of the Joint Industrial Council for the chemical industry, where they were lectured by one of the labour men upon brains and how to put them into industry. This man said that he had lately met a man who had so successfully put brains into his business that he had not reduced wages, but had been able to lower his wages bill by £20,000 during the past year. He recommended that idea of putting brains into business to all who were connected with the chemical trade, but he entirely agreed with Lord Riddell that Britishers were far too apt to belittle themselves, and he had represented, on behalf of the chemical trade as a whole to the Joint Industrial Council, that the chemical industry had always put brains into the business and was putting more brains into the industry now than had ever been the case during the whole of its career. Another matter mentioned by Lord Riddell appealed to him, and that was the question of greater unity. Some of those in the industry looked to the Club to help in that matter. The industry had need of the pure research chemist, the works chemist, the chemical engineer and metallurgist, and it was to be hoped that a great many of these men would come together. They had been looking to the Federal Council of Pure and Applied Chemistry, and it was to be hoped that their efforts might be successful in bringing together the warring but friendly societies which represented the chemical profession and the chemical industry. They all looked forward to the Club doing a great deal for those warring elements which it was hoped would become very much more friendly in the future to the great advantage of the profession and industry.

Sir W. Alexander

Brigadier-General Sir WILLIAM ALEXANDER, K.B.E., proposing "The Chemical Industry Club," said the history of the Club was a short but glorious one. This was still only its fourth dinner, but it was a mighty strong child and was doing a great deal of good. Lord Riddell had pointed out how we Britons had usually been the initiators of new inventions, but initiation did not mean everything. There was development after the invention, and if we paid more attention in the future to development we should reap the financial benefits which hitherto we had allowed others to take away from us. He had recently returned from America, where he had been the guest of the Chemists' Club of New York. That, to him, was a wonderful institution. He was glad to see Mr. Duggan present with them that evening. The New York Chemical Club brought together chemists of all classes, whether they were industrial chemists, technical chemists, engineering chemists, or physical chemists. At the Club, where they had a magnificent library, they met together not only for social intercourse, but in very many cases they talked over business problems together. He hoped in time that we should be able to institute in this country a club on the lines of the Chemists' Club of New York, where chemists from all parts of the Empire and America met and discussed business. Such a scheme would do an enormous lot of good in this country, and he felt that the Club, as it at present existed, was developing on the right lines for this later development. As an example of American methods, he mentioned the activity with which they were developing short cuts in rubber vulcanisation.

Sir WILLIAM POPE, who replied, said he looked to the Chemical Industry Club to play a very great part in pulling together the various chemical interests in this country. What they really wanted now was the assistance of men like Sir William Alexander and the leaders of the chemical industry to help in launching the Club on to the much broader basis, which all of them realised had got to come presently.

Mr. C. S. GARLAND, M.P., proposed "the Guests," and made special reference to the presence of Sir Max Muspratt, whom he congratulated upon the honour the King had recently done him, and Mr. Duggan, of the Chemists' Club of New York.

Sir Max Muspratt

Sir MAX MUSPRATT, replying to the toast, said he was an extraordinary believer in the human touch in industry. A short time ago he was asked to give an inaugural address at the new Widnes Chamber of Commerce, and he chose as his subject "The Human Factor in Industry." He ventured to say there, at some length, what he would now say in a very few words. There was an absolute necessity that we should allow the human element and the human conception to enter into our industry and our science. Many of the things that Lord Riddell had said were absolutely true. We Britons did under-estimate ourselves; we had a certain amount of reserve, and thought it was bad form to talk about what Britons had done in industry and science, and that was because we do not understand one another and do not trust one another sufficiently. No body of friends had the slightest objection to one or the other blowing his own trumpet in reason. The other extreme of not blowing one's trumpet because we were not friends meant that the whole of the British Empire was losing a valuable asset. They wanted from the smallest laboratory boy to the biggest professor to learn that they were all members of a great body of scientists and industrialists. We wanted it to be realised from the most humble apprentice in the works to the chairman of the biggest company that they were all one body, striving with heart and soul to keep England in its proud position at the head of the chemical industry of the world. It was because functions like that helped quite a considerable number of the members of the chemical industry and the chemical profession to realise that human touch, that he would always be proud to be present, whether as a guest or as the humblest member.

Mr. DUGGAN (Chemists' Club, New York), who also responded, gave an interesting account of that institution, and the proceedings closed with the toast of "the Chairman," proposed by Dr. E. F. Armstrong.

Safeguarding of Industries Act: Part I

Alleged Improper Inclusion of Sodium Phosphate in List of Dutiable Articles

On November 25 the Referee, under Part I. of the Safeguarding of Industries Act, considered a complaint that sodium phosphate has been improperly included in the list of articles chargeable with duty under Part I. of the Act. A preliminary objection arose, however, and the result was that the hearing of the actual complaint was held over and attention directed to the objection.

THE complainants were the Chemical Merchants' and Users' National Vigilance Committee, represented by Mr. Kenneth Swan and Mr. R. Lambert Parry; and the complaint was opposed by Thomas Tyrer and Co., Ltd., represented by Sir Arthur Colefax, K.C., and Mr. Stafford Cripps. The Board of Trade was represented by Mr. Whitehead. Originally a complaint was made by the Chemical and Dyestuff Traders' Association and the Colour Users' Association that "Sodium Phosphate, mono-, R Sodium Phosphate, di-, and Sodium Phosphate, tri-," had been improperly included in the list, but the complaint was withdrawn. The letter R (indicating refined quality) was prefixed to the item "Sodium Phosphate, tri-," in April last. The present complaint was also received in respect of "Sodium Phosphate," the complainants intending the complaint to cover the three items mentioned as well as others, such as sodium pyrophosphate. The Board of Trade objected that the complaint was outside the precise terms of the list, and contended that it was not valid, because there was no such item in the list as "Sodium Phosphate." The other opponents also objected.

Subject of the Complaint

Mr. SWAN, dealing with the preliminary point of objection raised by the Board of Trade and the other opponents, said that in the Board of Trade counter-statement it was stated that sodium phosphate meant, to chemists, the trade and the public, the substance di-sodium hydrogen phosphate or "sodium phosphate di-," and none other, and that this substance was not included in the list with the prefix R, indicating that only the refined substance was dutiable. The Board had objected to an inquiry into the other varieties, namely, mono-phosphate of sodium and tri-basic phosphate of sodium. With regard to pyro-phosphate of sodium, however, the Board had reserved its case.

Sir ARTHUR COLEFAX, speaking from the standpoint of the public, said his objection was that in the complaint no objection was raised to any substance mentioned in the list. He agreed with the Referee that the various substances mentioned by Mr. Swan were mentioned separately in the list, as also was sodium meta-phosphate. The complainants, however, sought to apply the term "sodium phosphate," in their complaint, to the five substances, each of which were specifically named in the list, whereas the term "sodium phosphate" did not appear in the list. He asked the Referee to rule that the notice was bad because it did not refer to any specific article mentioned in the list. If the Referee were against him on that point, then he would raise the objection that the notice of complaint was bad because it had not specified any definite article at all.

The REFEREE said he would imagine that any reasonable man, looking at the list, would take "sodium phosphate" to mean the "mono, di, and tri" varieties.

Stating a Case

Sir ARTHUR COLEFAX said that would mean that pyro-phosphate of sodium and the bi-pyro-phosphate of sodium were not within the complaint. If that were the view of the Referee, he (Sir Arthur) might ask him to state a case for the Courts on the point as to whether the "mono, di, and tri" varieties came within the notice of objection. If, on the other hand, the Referee decided that the "pyro and the bi-pyro" varieties also came within the notice of objection, then there was no question that he should ask him to state a case and to stop the inquiry at this stage.

The REFEREE said he was not quite sure about the right to ask for a case to be stated, but would discuss that later.

Mr. WHITEHEAD said that the position of the Board of Trade, from the legal and public points of view, was that the Act provided for these lists to be published and that objections could be taken to them. The purpose of the Act was that people might manufacture that which they had not previously manufactured, or enable them to continue to manufacture that which otherwise they might have ceased to manufacture. Therefore, a necessary essential was that there should be some limit of precision regarding the information given to the public both in the list and in the objections that were made to it. The Board of Trade case could be stated very shortly. An objection had been lodged to a substance to which the name "sodium phosphate" had been given. The Board believed that that phrase would be understood by everybody concerned to mean one substance and one substance only, viz., "sodium phosphate, di-," and no objection would be take to an inquiry into that, but very strong objection would be taken to any inquiry outside that.

A Generic Term.

Mr. SWAN said he did not believe the evidence would show the view of the Board of Trade to be correct. He agreed that the term "sodium phosphate" was sometimes used in a specific sense, but he had evidence to prove that it was also used in a generic sense, and it was in the generic sense that it had been used in lodging the complaint. He understood the position of the Board of Trade, and was prepared to deal with it, but he contended that Sir Arthur Colefax had no *locus standi* in this matter.

The REFEREE said he did not know that those representing the public were entitled to take points which were not in the Board of Trade counter-statement, but the point was taken in that statement, and Sir Arthur Colefax was present to support it.

Mr. SWAN pointed out that Sir Arthur Colefax's objection was not quite the same as that of the Board of Trade. It went further, and he submitted that it was irrelevant, because the Board of Trade had accepted a complaint as regards "sodium phosphate," and apparently Sir Arthur Colefax said the Board of Trade had no business to accept it. The Board had not pointed out that the complaint was irregular in any way, and they had accepted a complaint that the article "sodium phosphate" had been improperly included. He could understand the objection of the Board of Trade, but Sir Arthur Colefax was attempting to show that the complaint was bad on the face of it because the article "sodium phosphate" did not appear in the list. He agreed that Sir Arthur Colefax could support the Board of Trade objection, but he could not formulate another and wider one. The Act said that the objection must be to articles in the list, but it did not say that the precise language of the list must be used in lodging the complaint. There was a difficulty as to what sodium phosphate meant, and there was correspondence between the Board of Trade and some of the opponents in this case with regard to the meaning of "mono, di, and tri." The complainants had chosen to play for safety by using a general description for a chemical article which had three or four varieties.

The REFEREE said he could not conceive anyone reading the complaint applying it to anything except the "mono, di, and tri" varieties. But the complainants ought to have adopted the description adopted by the Board of Trade.

Sir ARTHUR COLEFAX said that if the term "sodium phosphate" was to be taken as meaning the "mono, di, and tri" varieties, the complainants should have said "sodium phosphates" instead. He asked why the public should be expected to draw the inference that "sodium phosphate" meant those three. If a man ordered simply "sodium phosphate," there was no doubt that he would get the di-basic.

Mr. SWAN, in reply to the Referee's remark that the complainants should have put in every variety to which they took objection, said he wanted to safeguard himself against the substance in which he was interested not appearing in the list by the name to which he was accustomed, and the term "sodium phosphate" was deliberately chosen on account of the vagueness of the list. It included all varieties, and was chosen after careful and deliberate consideration. When the list was studied by a chemist it was found to be full of pitfalls and tautologous expressions. They got the same material appearing under different names in different places, and, therefore, to safeguard himself he had to use a general expression.

Sir ARTHUR COLEFAX, replying on the point raised as to his

locus standi to raise a preliminary objection, said that as the public had no information except what was published in the reports of these inquiries, surely he, as representing the public, had the right to point out to the Referee how it was contended the notice was bad. He specially called the attention of the Referee to the notice issued by the Board of Trade with regard to this matter. After stating that there were other objectors than those who now appeared, Sir Arthur referred to the complaints of the Chemical and Dyestuff Traders' Association and the Colour Users' Association. Only the Chemical Merchants' and Users' Vigilance Committee now remained as complainants, and the Board of Trade had pointed out in a public notice that they did not accept the complaint as covering all varieties of sodium phosphate.

Mr. WHITEHEAD said that Mr. Swan did not contest the point that the "mono, di, and tri," were three separate varieties, and all that Mr. Swan was saying was that there is a generic name which covered all three.

The REFEREE said Mr. Swan was saying more than that—he was saying that there was no specific substance covered by the expression "sodium phosphate" that would be understood by the public.

Mr. WHITEHEAD, replying to Mr. Swan's point, said he would have thought that the meaning of the Board of Trade list was obvious. The Board had selected specific names and put them in the list, and the suggestion that the list was vague, and that, in consequence, the complainants had had to select an omnibus name instead of specific names, did not seem to him very plausible. The Board wished to make it clear that, as a public department between several contestants, there must be some finality, and it must seek to protect everybody as fairly as possible.

The Two Principles

The REFEREE said it was difficult to give a ruling on this matter at the moment. There were two different principles. One was that a comparison of the list should be made with the complaint. If that were the correct view, he could not help thinking that anyone reading the two together would suppose that the expression "sodium phosphate" referred to the "mono, di, and tri" varieties and nothing else. The other principle he had been asked to adopt was whether an expression had been used in the complaint which did not appear in the list. In that event, it was said, he must take evidence to see what, if any, item appearing in the list would be understood in the trade to be covered by that expression. If that was the correct principle, he thought that any expression used, if it had a specific meaning would have to be applied with that specific meaning, because he felt sure that the complainants first duty was to be precise, and if they had used an expression which had a definite and precise meaning, which Mr. Whitehead said it had, then the complainants would be tied to that. Which of the two principles to adopt he hardly knew. He could not adopt the second without taking some evidence, and if there was any idea of a case being stated, it would be more convenient to have the evidence on the application of the second principle he has suggested before a case was stated. On the whole, he thought it would be best, at this stage, to take evidence as to what "sodium phosphate" was understood to mean in the trade. If Mr. Whitehead established that it had a specific meaning, that practically ended the case, because it restricted it to one substance which had the letter R against it in the list. If, on the other hand, Mr. Swan could satisfy him that the expression had no specific meaning and was thoroughly well understood in the trade to mean either substance, the case would come before the Court with that finding of fact. He thought it would be wiser and safer to take evidence on that question of fact without determining for the moment which principle to apply. Speaking quite frankly, his inclination was to apply the first principle at the moment. If anybody asked him to state a case afterwards he would do so, because he agreed there was a question of principle.

Mr. WHITEHEAD said the Board would certainly ask for a case to be stated.

The REFEREE said he would rather the Board asked him to state a case than Sir Arthur Colefax, because he was not sure that people coming in to support the Board were entitled to take a different line, although he had not determined the question of *locus standi*.

Sir ARTHUR COLEFAX said that if it were not established to the Referee's satisfaction that "sodium phosphate" meant one thing only, it would not follow that it was a generic term, including the five substances.

The REFEREE said it would certainly not.

Mr. SWAN then handed in a "family tree" of the different varieties of sodium phosphate, on the left of which were the three forms of phosphoric acid from which the phosphates were derived; on the right were the different names by which the phosphates were known. His contention was that the expression "sodium phosphate" covered everything in the family tree. He agreed with the Referee that when he spoke of "sodium phosphate" in the complaint he meant sodium salts of phosphoric acid, and that was the proper meaning of the expression.

Trade Definitions

Mr. E. J. PARRY (consulting chemist) said he would understand "mono, di, and tri" to refer to the three forms of the salts of ortho phosphoric acid. There was an ambiguity with regard to pyro. To the chemist, "pyro-phosphate" would indicate the two salts based on the pyro phosphoric acid, $Na_4P_2O_7$ and $Na_2H_2P_2O_7$, but in the trade the expression "pyro-phosphate" was universally applied to a body which was not the true pyro-phosphate. In the trade the expression meant what was really commercial bipyrophosphate, because the other did not practically exist. The biphosphate in the Board of Trade list he would understand to mean mono-basic sodium phosphate. Speaking as a chemist, the expression "sodium phosphate" was used, so far as he knew, in all the text books as a generic term and as a general heading, under which the various forms were described. Ordinary di-sodium phosphate was frequently spoken of as common sodium phosphate. When he saw the words "sodium phosphate" alone he understood them to mean di-sodium phosphate. A number of text books and trade catalogues were then handed in, to show that "sodium phosphate" covered all the phosphates generally, and that the different varieties were described below in detail. Mr. Parry did not know of any text book in which sodium phosphate meant anything other than what the Board of Trade said it did, namely, Na_2HPO_4.

In cross-examination by Sir Arthur Colefax, Mr. Parry agreed that the three acids—ortho, pyro and meta phosphoric acid—were recognised as distinct by chemists, but they were invariably treated as three separate varieties under the general heading of phosphate, and were modifications of the original substance. Sir Arthur said they were not modifications of any one body, and asked Mr. Perry for the formula of the substance of which they were modifications. Mr. Parry said there were three formulæ. Therefore, said Sir Arthur, they could not be modifications of any one body.

Mr. SWAN said that, on the correspondence between the Board of Trade and some of the complainants, the Board had seemed to have treated the complaint as one against the three varieties, "mono, di, and tri." He submitted that the subject of the complaint could not have been the "sodium phosphate, di," because that had an R against it in the list, and words would have been used in the complaint to indicate that that was the substance of the complaint. He asked the Referee to accept the view that "sodium phosphate" was deliberately used in the complaint to cover all varieties.

A Point of Law

The REFEREE said that on the evidence it was clear what sodium phosphate meant.

Mr. SWAN, in reply to questions, said he was not going to question the "di and tri" entries in the list with the R against them, but he wanted to attack the "mono."

The REFEREE said he could not help thinking that the complainants' notice applied to all three varieties. Some discussion arose as to the point of law on which a case could be stated, in the course of which the Referee stated that Mr. Swan could take it that he was against Sir Arthur Colefax on the question of whether, as a point of law, the complaint lodged compiled with the requirements of the Statute, because he considered the evidence had made it clear that the complaint was directed to one substance in the list. Therefore, what was the point of law?

Mr. SWAN said that if that were disposed of he did not think there was a question of law.

The REFEREE intimated that he would consider his decision, and indicated that he had not much sympathy with the complainants in having drawn up their complaint in the manner they had done.

Scotland's Contribution to Chemistry

Some Great Chemists and Manufacturers

In the course of a paper read before the North British branch of the Pharmaceutical Society on November 24, Dr. J. C. Irvine dealt at some length with Scotland's contribution to chemistry.

In tracing the connection between Scotland and the development of chemistry, said the lecturer, no more appropriate initial date could be chosen than that on which the Royal Society of London was founded, for this date marked the climax of the great revival of experimental philosophy with which we always associated the name of Boyle. One of the founders of the Royal Society was Robert Murray, a St. Andrew's man and graduate. It was his interest and personal persuasion which secured for the Society its Royal Charter, and thus the pursuit of science, and with it, chemistry, first became an organised effort in this country.

After alluding to the indirect way in which Scottish influence, in the person of James Fullerton, had also been active in promoting chemistry in Ireland, the lecturer said that although we must credit Lavoisier with the major share of the credit for breaking down the theory of phlogiston, it must be remembered that his work was only possible through the earlier researches of Joseph Black. Further, it must not be forgotten that at least one half of the problem of the composition of atmospheric air was solved by Rutherford of Edinburgh.

Work of Joseph Black

While it might be held that Joseph Black was not a true Scotsman, the whole of his work was carried out in Glasgow and Edinburgh. It was in fact within easy reach of them that the balance was first systematically used as a guide to study chemical reactions. Referring briefly to the work of Black, the lecturer said that if he alone stood as the champion of Scottish chemistry, they might still be proud.

In connection with the problem of atmospheric air, Rutherford's name came before them again, for it was he who discovered nitrogen. They had thus a direct sequence in the researches of Black, Rutherford, and Lavoisier, which opened up the way to the theory of oxidation and ultimately to the Atomic Theory itself. Any attempt to trace the acceptance of the Atomic Theory at once called to memory the name of that Scottish chemist, Thomas Hope, who vacated his Chair in Glasgow to join Joseph Black in Edinburgh. Himself an expert experimenter, Hope recognised that chemistry could make progress only if taught by practical methods. Thus he, together with his assistant, Dr. Anderson, instituted a laboratory for the practical instruction of students. It was true that the claim that this constituted the first practical chemistry course in the country had been disputed, but this need not concern them, as the rival claimant was also a Scotsman.

Thomas Thomson would be remembered for the support he gave to Dalton and his share in the foundation of student laboratories. Between 1800 and 1811 his laboratory was in working operation in Edinburgh, and so far as the lecturer was aware it seemed to have been the first of its kind in the British Islands.

Thomas Graham on Colloids

No one could maintain that Scotland failed to play her part in the critical theoretical movements which took place a century ago. Dalton himself recognised that there were chemical workers and thinkers north of the Border, for it was to his friend Professor Thomson, of Glasgow, that he first communicated his atomic hypothesis, and on whose advice he gave public expression to his views.

Coming next to Thomas Graham, whose statue stands in George Square, Glasgow, the lecturer said that no one who had studied his life and work could doubt that in this man Scotland gave a chemist to the world who rivalled Priestley as an experimenter and Dalton as a thinker. With the simplest of apparatus he penetrated the mysteries of solution, diffusion and dialysis. Exactly 73 years ago he began his memorable work on the colloidal state of matter.

One of Graham's outstanding pupils, Lyon Playfair, who matriculated in St. Andrews in 1833, was a fellow student under Graham with James Young, the founder of the Scotch paraffin oil industry. If Playfair's original scientific discoveries were few, his scientific influence was truly enormous. He was one of the first to attempt the fusion of manufacturer and scientist, and he cast everything he held most dear into the crucible to make this valuable alloy. One of the products was the 1851 Exhibition. Another, the valuable research scholarships which are financed out of the surplus from that venture, for it was Playfair's influence which prevented the money being squandered in the erection of a popular museum. Out of 429 appointments made to the Scholarship between 1891 and 1915, no fewer than 219 were allotted to the subject of chemistry. Playfair was also one of the founders of the Chemical Society.

Sir David Brewster, who, in succession, was Principal of the United College, St. Andrews, and of the University of Edinburgh, was one of the most active members of the band of scientists who formed the British Association, and thus Scotland could claim the honour of being concerned in the foundation of the three great scientific societies of our time.

Looking back through 80 years two figures in the realm of organic chemistry stood out boldly. One was Alexander Williamson, nearly blind and partly deformed, the other was Archibald Scott Couper, to whom Providence gave a heavy burden. Williamson, though born in Wandsworth in 1824, was of Scottish parentage. His student course was taken out under Graham and Liebig, and he was appointed to the Chair of Chemistry in University College, London, when vacated by Fownes. Williamson threw himself whole-heartedly into the development of the University of London as a centre of chemical study. He instituted a Faculty of Science and was the first to introduce chemical study for engineers. Chemistry, through Williamson's agency, permeated London more thoroughly than ever before, and more than that, one could even regard this man as the missionary of science to the Far East.

Couper's Theory

In 1858, three papers from a Paris laboratory appeared in the *Comptes Rendus* over the signature of A. S. Couper. Two were experimental—on some derivatives of benzene and on salicylic acid—the third was purely theoretical, and dealt with the structure of carbon compounds. It aroused intense interest; then, with startling suddenness, the record came to an end, and Couper passed into the outer darkness of oblivion. That the theoretical paper referred to included a hypothesis to all intents and purposes identical with that of Kekule was fully recognised, but as no one was acquainted with Couper's previous or subsequent history, as his very nationality was unknown, his name was speedily forgotten.

It had remained for a German chemist—Richard Anschutz, to claim for Couper the recognition as a master of theory, which has been too long delayed. No finer example of the universal brotherhood of science could be cited than the effort made by Anschutz to do justice to the memory of an obscure stranger to whom he owed nothing. Several years ago, Anschutz repeated Couper's experiments on salicylic acid, the results of which had been disputed and even rejected as unsound. At every stage he found Couper's work to be reliable, and he then set himself the task of tracing the career of this unknown man whose name had flashed meteor-like across the sky in 1858 and was so dramatically eclipsed. In this work he received invaluable help from the eminent Edinburgh chemist, Professor Crum Brown, who died recently.

Couper was born in Kirkintilloch, near Glasgow, in 1831. His resolve to take up chemistry seemed to have come as an inspiration, for after having devoted himself almost exclusively to philosophy he suddenly dashed off to Paris to study with Wurtz. Within three sessions of first joining the laboratory he commenced research, and only cruel ill-fortune deprived him of the honour of being the father of structural chemistry. Early in 1858 he sent his paper "On a New Chemical Theory" to the French Academy of Science. It was certainly in the hands of Adolphe Wurtz before May 19, a date which became important in view of subsequent events. Wurtz seemed to have hesitated in his decision to recommend the paper for publication in the *Comptes Rendus*, and it was the month of July before it appeared under the patronage of

Dumas. Meanwhile the issue of Liebig's *Annalen*, which appeared on May 19, contained Kekule's classical paper "Uber die Constitution und die Metamorphosen der Chemischen Verbindungen und die Chemische Natur des Kohlenstoffs." Couper was forestalled through no fault of his own. In all fairness to Kekule, he treated Couper's theory, which was a distinct advance on his own, with generous appreciation, but he adhered rigidly to the relative dates of publication and claimed priority for himself. Couper made little or no attempt to uphold his position. The outer world heard no more of him, yet to-day it was his system, rather than Kekule's, which enabled us, to build up these stupendous structural formulæ which was at once the terror of the uninitiated and the delight of the true organic chemist. His health broke down within a few months of the appearance of his paper and, while convalescing, he suffered a severe attack of sunstroke which enfeebled him for the rest of his days. At his old home in Kirkintilloch, he lingered until 1892, living unknown, while in every University in the world his theory was being taught as one of the finest working hypotheses of our time.

Genius of Professor Crum Brown

When we came to our own times and reflected on the progress made through the structural study of organic compounds, all chemists would agree that we owed much to the instinctive genius of Crum Brown. His rare mind was not content with the haphazard methods of substitution in the benzene series, and his generalisations did more than we could well appreciate to elevate this branch of synthetical chemistry into an exact science.

Were he to include also a recital of isolated important discoveries which were initiated by Scots, the lecturer said the list would be endless and would include no more striking case than Frederick Guthrie's first preparation, made in Edinburgh, 60 years ago, of the deadly compound now known as "mustard gas."

In physical research Scotland had no unworthy record, and it was only a fortnight ago the name of another Scottish chemist was engraved on the wall of Westminster Abbey. Sir William Ramsay opened up a new world by his discovery of the inert gases and the manner in which his results prepared the way for the study of radioactivity and the new ideas regarding the structure of the atom commanded the highest admiration. His name would be remembered wherever chemistry was known and it would be remembered also that he hailed from the Forth of Clyde.

For many reasons he had not included chemists of to-day, but he could pass to the second aspect of his subject without reference to Sir James Dewar's heroic efforts to study the properties of matter in the neighbourhood of the absolute zero. Again it was a case of pioneer work, and the achievement was due to one who was born on the opposite shore of the Forth and studied in Edinburgh.

Scottish Chemical Industries

Turning now to the influence of Scotland on the history of chemical manufacture, the prospect seemed at first sight far from encouraging. To-day they had no firms in Scotland which could compare with the Badische Anilin und Soda Frabrik—and in the past no name might occur to them of men who, like Perkin senior or Ludwig Mond, had given the world new industries of colossal magnitude. On looking a little more closely into the position, however, it would be found that Scotland was by no means discredited by the position she took as a manufacturing centre and as the birthplace of new and important chemical industries.

Bound up as their manufacturing interests must of necessity be with their coal and iron supplies, it was not surprising that they could lay claim to many of the metallurgical processes which had revolutionised this branch of industry. The introduction of the hot blast in the manufacture of pig-iron, patented and used first by the chemist of the Clyde Ironworks, would stand as one of many examples which could be cited.

Charles Tennant's Process

Few records existed of early chemical manufacturers, and the processes developed more or less independently of the growth of pure science, but a good idea of the standing of a country in chemical industry was gained by comparison of its position in the alkali trade. Applying this test to Scotland, they had to go back to the days of James Watt, the engineer, for it was he who brought the news to Glasgow that Berthollet had obtained a fluid possessing powerful bleaching properties by passing chlorine into caustic potash. He communicated this news to his friend Charles Tennant, who improved on the process by the substitution of slaked lime for the soluble alkali, and took out the first patent for the manufacture of bleaching powder in 1798. The direct outcome of this new venture was the erection, also by Tennant, of a sulphuric acid plant at his Glasgow factory in 1803. The same year saw the first technical preparation of soap commenced by the same firm: thirty years later the Leblanc process was adopted, and thus Scotland was in the foreground as a producer of all the various products of the alkali industry. However one might regret the gradual absorption of the old Scottish firm in the United Alkali Co., this could not entirely destroy their satisfaction in thinking of the endless discoveries emanating from Scotland which did so much to keep the alkali industry in that country for the space of nearly a century.

Destructive Distillation

It was interesting also to notice that Scotland led the way in the process of "destructive distillation." As Professor Henderson said in his report to the British Association, "The problem of how to distill a carbonaceous material most economically has been solved in Scotland." The beginning of the many industries which depended on destructive distillation was found about the middle of the eighteenth century, when Bishop Watson, in his "Chemical Essays," described the preparation of coal gas by this process. It was left to a Scotsman—William Murdoch—to expand the idea into a large-scale process. The process of destructive distillation was spreading all over the country at the beginning of the nineteenth century. In 1806 it was applied to wood by another Scot named Turnbull, and a factory producing charcoal and acetic acid was erected at the Vale of Leven. But Scotland's greatest triumph in this field was found in the work of James Young, of Kelly, and his successors. Scotland had no natural oil deposits, but James Young—a pupil of Graham—had to dig deep in the earth for his raw material. The bituminous shales yielded crude paraffin oil when destructively distilled, and out of this fact Young made an industry. The honour ascribed to Young was in great measure shared by Dr. Beilby, who came to the rescue of the process during a period of stress in 1881 by introducing an improved method of extracting all the nitrogen in the form of ammonia. Another striking example of Scottish perseverance in combination with scientific method occurred in William Henry Perkin, the discoverer of aniline dyes, and Robert Pullar, of Perth.

Manufacture of Cyanides

Dealing with a new industry which had arisen in our own times—the manufacture of cyanides, Dr. Irvine recalled the fact that Dr. Beilby patented a process in 1891 in which potassium cyanide is prepared by the action of ammonia on a heated mixture of potassium carbonate and carbon. Within five years the process was producing over a ton a day of the product at a price of only 10d. per lb.

One feature was, however, lacking in Scotland's record as a manufacturing country. Despite the great variety of the compounds produced they belonged almost entirely to the category known as "heavy chemicals." It was true that four out of the eight branches of Nobel's Explosives Co. were situated in Scotland, but, at the most, they could only claim that these industries had found a home there. They were not strictly speaking our own. The somewhat melancholy fact remained that from the port of Glasgow they shipped their heavy chemicals, while Leith, their nearest port to Germany, formerly received large consignments of the so-called fine chemicals. There were bright exceptions to this gloomy generalisation. Edinburgh had long been a centre for the manufacture of drugs. It was something to be proud of that the scientific extraction of alkaloids was developed there and was still an important local industry. Again, everyone remembered Simpson's dramatic discovery of the use of chloroform as an anæsthetic, but few realised the skill and enterprise of the Edinburgh manufacturers who prepared the chloroform for the first experiments and had since been among the principal manufacturers of the material. These examples were significant, for they showed that there is no insuperable difficulty in the way of Edinburgh taking a foremost place in the fine chemical industry.

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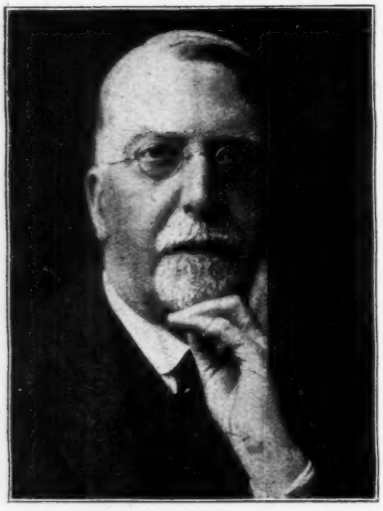
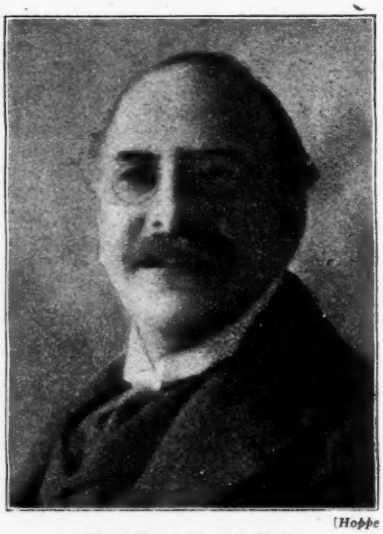


Sir Sydney H. H. Henn, M.P.

Portraits of two more distinguished representatives of chemical industry in the new Parliament are given on this page. Sir Sydney Henn, who was returned as Conservative member for Blackburn, is chairman of Lankshear, Wickstead and Co., Ltd., tartaric acid manufacturers, of London. He is also a director of Forsters' Glass Co., Ltd., the Horseley Bridge and Engineering, Co., Ltd., the Isleworth Rubber Co., Ltd., and other companies. Sir Alfred Mond, a son of the late Dr. Ludwig Mond, who has just been re-elected chairman of the Mond Nickel Co., Ltd., continues in Parliament as the Liberal Member for Swansea. In the late Government he held the office of Minister of Health, and distinguished himself for the business-like spirit in which he handled housing and other problems. He is a prominent member of the National Liberal group in the Commons.



[Hoppe

Sir Alfred Mond, M.P.

The Estimation of Starch

Experiments with Barley and Wheat

An interesting contribution on the subject of the estimation of starch in barley and wheat was given on Thursday, November 23, at a joint meeting of the Birmingham and Midland Section of the Society of Chemical Industry and the Institute of Brewing at the University of Birmingham, by Professor Arthur R. Ling (Department of Fermentation and Brewing, Birmingham University).

The work described was carried out under the Institute of Brewing Research Scheme with the aid of a grant from the Institute Committee. Professor Ling pointed out that starch was the most widely disseminated reserve carbohydrate in the vegetable kingdom and had an economic importance possessed by few other vegetable products. In some form or other, either as such or as a derivative, it entered into the dietary of man and animals to an extent exceeded perhaps by no other substance, whilst its many uses in the arts gave it a prominent position in several branches of chemical industry. It was remarkable therefore that up to the present, despite numerous attempts, no really satisfactory method of estimating starch had been devised. Professor H. E. Armstrong had said that this was little short of a scandal. To the agriculturist, maltster and brewer an accurate method of estimating starch was of the utmost importance, seeing that it was the main constituent of all cereals. The isolation of starch presented no insuperable difficulties, the processes adopted being of a physical rather than of a chemical nature; but the behaviour of starches of different origin when submitted to hydrolysis in the presence of enzymes or of acids had revealed certain divergencies which constituted one of the reasons why the methods which had been devised for the estimation of this polysaccharide in vegetables and in commercial products gave untrustworthy results.

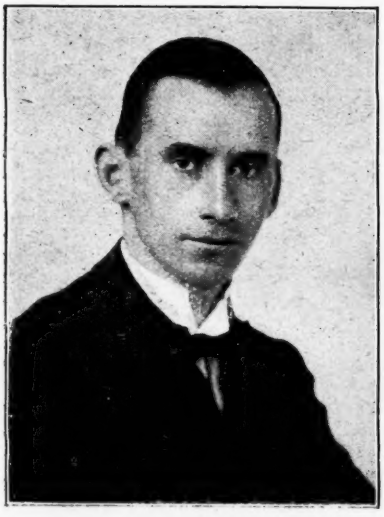
Because of the uncertainty of the results afforded by most of the methods proposed for estimating starch, a practice arose of reporting the percentage of so-called "nitrogen-free extract"—a difference value—instead of the percentage of starch. The author observed that, as a difference value, the percentage of "nitrogen-free extract" was vitiated by errors inherent to all the other estimations; consequently, the percentage of total nitrogen expressed as proteins and that of fibre might differ widely from the absolute values. The basis of all methods for starch estimation depended on the fact that starch could be rendered soluble by treatment with water in the presence of an acid or an enzyme.

Giving an historical account of the methods proposed for the estimation of starch, Professor Ling expressed the view that C. O'Sullivan in 1884 approached the problem on sounder lines than any previous or subsequent investigator. Having established the fact that the cereals contain besides sugars other soluble carbohydrates of a gummy nature, he based his well-known method on those discoveries. Dr. Horace T. Brown and his co-workers in the celebrated Guinness researches had found O'Sullivan's method to be on the score of accuracy the best which has been proposed; but the length of time required to extract the so-called "amylans" entirely ruled out its application for practical purposes.

Action of Malt Diastase

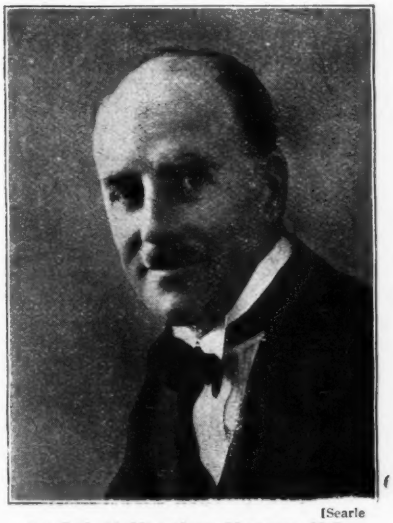
The Guinness workers had devised a rapid method of estimating starch depending on the fact that when malt diastase acted on starch at 55–60° C. there was an apparent resting stage in the reaction. According to this, the percentage of maltose produced at the end of a given time (say, one hour) bore a constant relation to the starch originally present. The actual percentage of maltose found in this way varied, however, according to the diastatic power of the malt employed. If, as previous investigators stated, the percentage of apparent maltose produced by the hydrolysis of starch as measured by cupric reduction was a function of the diastatic power of the malt employed, then, in order to render the method a practical one, it would be necessary to determine how the percentages of apparent maltose varied with the diastatic powers of the malts employed. These relations, said the author, had now been determined, employing barley starch and wheat starch in which the impurities had been reduced to a minimum and the results corrected for these. These two starches were found to give identical results on hydrolysis with malts of different diastatic power at a temperature of 57° C. The method had accordingly been applied to barley and wheat. Other cereals as well as malted grain would be dealt with later on.

As to the methods, Professor Ling pointed out that ground barley or wheat was extracted for three hours with alcohol of specific gravity 0·920 which removed some of the proteins, and the sugars and fats. No starch could be detected in the alcoholic extracts. After the extraction, the thimble was allowed to drain for a few minutes, and the contents were washed into a beaker of 300 c.c. capacity with about 100 c.c. of distilled water. The starch was then gelatinised by boiling the contents of the beaker with constant stirring for ten minutes. The starch paste was cooled to 57° C. and placed in a water bath at that temperature. Ten c.c. of the extract from a malt of known diastatic power were then added to the paste and the hydrolysis was allowed to proceed at 57° for an hour. It was no advantage to employ an electric turbine for the stirring, which, indeed, could be more efficiently carried out by hand. The conversion liquid was then boiled and filtered into a 200 c.c. graduated flask. The maltose was



Sir Frank B. Sanderson, Bart., M.P.

Sir Frank B. Sanderson, Bart., who was elected as Conservative member for Darwen, was the founder of the seed crushing firm of Wray, Sanderson and Co., Ltd., and of the Humber Fishing and Fish Manure Co., Ltd. He is also chairman of the Seed Crushers' Association. His entry into politics is, he states, particularly as a business man, convinced that our financial and industrial problems can best be surmounted by men who have experience in national and international trade. A nephew of the late Octavius Vaughan-Morgan, the first Member of Parliament for Battersea, Lt.-Col. Kenyon Vaughan-Morgan is a director and vice-chairman of the Morgan Crucible Co., Ltd., of which company he was managing director for many years. Col. Vaughan-Morgan played a prominent part in the war. He was mentioned in despatches and received the O.B.E. (Military Division) in 1919.



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Lt.Col. K. Vaughan-Morgan, M.P.

then estimated and the percentage of starch calculated by the formula $S=94{\cdot}73\ M^1/M$ in which S was the percentage of starch in the sample, M was the percentage of apparent maltose produced from dry barley or wheat starch by the action of malt extract from malt of a definite diastatic power, and M^1 was the percentage of apparent maltose produced from the sample under the same conditions and with malt of the same diastatic power. In a final test of accuracy the starch was estimated in a sample of wheat using a malt of diastatic power 87° (Lintner), and as a result of two estimations Professor Ling stated that the values 63·9 and 64·0 were obtained as the percentage of starch in the dry wheat. Some of the same wheat was then mixed with pure wheat starch of known moisture content and the mixture analysed, employing a malt of diastatic power of 67° (Lintner). The method was applied to barleys and wheats grown on the famous Broadbalk field at the Rothamsted Agricultural Experimental Station and at the Olympia Agricultural Research Station, Offchurch, and the results showed that it was accurate. It was to be adopted as a standard method.

Discussion

Dr. E. B. Maxted (who presided) inquired if the method were suitable for the estimation of starch in commodities other than cereals, as starch occurred in many forms.

Mr. H. J. Page (Rothamsted Agricultural Experimental Station) observed that he worked with Mr. W. J. Price, one of Professor Ling's collaborators, in making some of the tests, and, all things considered, the professor was to be heartily congratulated upon the accuracy of the results obtained and upon doing a great service to all branches of bio-chemical work. He welcomed the method particularly because at Rothamsted they were now starting on a comprehensive series of analyses of barleys, the object of which was to obtain more accurate knowledge as to the influence of manurial, climatic and soil conditions on barley. There were 200 samples to be investigated. He was also interested to know if the method could be extended beyond the scope of cereals to fertilisers, etc.

Professor Ling said he had so far confined the method to cereals, but it was his intention in the near future to apply it to other starches. He had even refrained from putting forward the method as applicable to starch in malt. Experiments were, however, going on, and these they hoped would give accurate starch estimations. The simplicity of the method was due to the great work of Dr. Horace T. Brown.

Replying to other questions, Professor Ling said he had not applied the method to maize starch, and as this was highly resistant different treatment would probably be necessary; while in the case of certain drugs it would, of course, be necessary first to remove the fat. Otherwise the enzyme could not act upon the starch.

Chemical Matters in Parliament

Safeguarding of Industries Act

In reply to Mr. Hannon (House of Commons, November 27), Sir P. Lloyd-Greame said his present information indicated that the industries affected by Part I. of the Safeguarding of Indusries Act had been enabled to continue, and that the range of production had been considerably extended. He had recently requested the trade associations concerned to furnish his Department with periodical information as to employment in the industries covered by Orders made under Part II. of the Act, but returns were not yet available. The Act had, without doubt, conferred certain distinct advantages on the industries of this country. He had no reason to suppose that a single man had been thrown out of employment by reason of the Act.

Duty under Part II

Mr. Baldwin (House of Common, November 27) informed Major M. Wood that the amounts of duty collected under Part II. of the Safeguarding of Industries Act up to November 24 included: Gas mantles, £35; and illuminating glassware, £3,599.

In reply to Capt. Wedgwood Benn, Sir P. Lloyd-Greame said the only Order under Part II. during the Recess was that relating to mantles for incandescent lighting and their component parts manufactured in Germany. A question by Mr. Wedgwood as to the general result of that Order on the value of the shares of the Welsbach Co. was, said Sir Philip, irrelevant, and he must ask for notice of it.

Surplus Government Chemicals

Mr. Hancock (House of Commons, November 28) asked the Chancellor of the Exchequer whether there had been any sale of chemicals by the Disposals Board other than the one of September, 1920; and, if there had, would he give the dates of such sales, the names of the buyers, and the prices realised?

Mr. Baldwin said the answer to the first part of the question was in the affirmative. The preparation of the return required would necessitate considerable clerical labour involving expense which, with the depleted staffs now available, could not be justified.

Imperial Mineral Resources Bureau

The Imperial Mineral Resources Bureau announce that the Committee now comprises: Sir R. A. B. Redmayne (chairman); Lord Morris; Dr. John William Evans; Messrs. Westgarth Forster Brown; Hugh F. Marriott; Frederick H. Hatch; and Major W. H. Henderson-Scott (*ex officio*, as secretary to the Bureau). Captain C. A. Vaux is secretary.

Chemistry in the War

Some Remarkable Manufacturing Achievements

In the course of his Hurter Memorial Lecture, delivered on November 22 before the Liverpool Section of the Society of Chemical Industry, Mr. William Macnab, F.I.C., in illustration of the enormous war demand for explosives and chemicals, said that 68,500 tons of picric acid; 238,000 tons of TNT; 378,000 tons of ammonium nitrate; and 139,000 tons of cordite, were produced during the war. He referred to the improvements which had been made in the manufacture of picric acid. The employment of ammonium nitrate, mixed with T.N.T. as a filling charge for shells, led to great development of the production of ammonium nitrate, the largest amount being made by double decomposition of sodium nitrate and ammonium sulphate, a fine instance of the successful application of the phase rule.

Mr. Macnab then reviewed the work done in France, particularly in regard to the production of synthetic phenol from benzene. He also dealt with the manufacture of nitric acid and ammonium nitrate.

Keen Competition Anticipated

Chemical industry in nearly all its branches, he continued, received a great stimulus during the war, and in the future keener competition must be expected from France and America as well as from Germany. The war had brought a very large number of chemists into close contact with industrial work. They had gained valuable experience in factories and had become practically acquainted with the construction of plant and the running of chemical processes, and in many instances the *coup de grâce* had been given to rule-of-thumb methods.

Work of British Chemists

British chemists, he concluded, might look forward with hope to holding their own and competing successfully in all branches of chemical industry if they sought for and applied the highest scientific knowledge available. Many university professors and teachers did splendid work during the war and were also brought into close contact with many works and those controlling them. This experience, as well as the broadened sympathy which must have resulted between professors and manufacturers, should be very helpful in developing technical education on sound lines.

Liverpool Nitrate Co.'s Meeting

Sir Robert Harvey on the Outlook

Speaking on November 23 at the thirty-ninth annual meeting of the Liverpool Nitrate Co., Ltd., Sir Robert Harvey (the chairman) said that the remodelling of Oficina San Lorenzo was practically completed, and it was now making nitrate. The company had been assigned a provisional quota there of 48,000 Spanish quintals a month against 29,000 quintals previously, and their new plant enabled them to treat the lower grade material which before they were unable to work. The low range of selling prices, coupled with restricted output, was not, however, very favourable to working low grade material; nevertheless, from an income point of view the remodelling had added materially to the life of the property. The position of Chilean nitrate *vis-a-vis* with other nitrogenous fertilisers was never so favourable as it was to-day, and the officially recognised needs of the consuming countries were very great. The latest accounts of the probable consumption during the coming season in the United States were particularly encouraging. As regards Europe, unfortunately the purchasing power of the consumers was more than ever limited by the adverse exchanges. Germany would gladly receive about 1,000,000 tons of nitrate of soda from Chile over the coming season, but it was quite hopeless to think of her being able to finance any such quantity. He mentioned this, however, as a reply to fears sometimes expressed that the Chilean nitrate industry was in danger of being swamped by synthetic products as at the present time nothing was further from facts and statistics.

At an extraordinary general meeting following the ordinary meeting a bonus distribution scheme was approved, as was also a proposal to increase the capital of the company to £700,000 by the creation of 2,400,000 new shares of 5s. each.

The Chemistry of Coal

Professor Bone's First Cantor Lecture

Professor W. A. Bone, F.R.S. (Professor of Chemical Technology, Imperial College of Science and Technology) is giving a series of three Cantor Lectures before the Royal Society of Arts, on "Brown Coals and Lignites." The first lecture was delivered on Monday, and this amplified a paper which he read before the Society in February last, which was an outline of the position with regard to these fuels throughout the world. For some years experimental investigations have been carried out at the fuel laboratories of the Imperial College of Science, and it has been found that some of these brown coals are suitable for use in the production of power. In fact, the Government of Victoria (Australia) have in hand a scheme for the generation of electric power on a large scale, utilising the immense brown coal deposits at Morwell. Referring to the development by German engineers of a considerable brown coal technology, Professor Bone said they had acquired a reputation which was, perhaps, rather exaggerated. There seemed to be an idea that outside Germany there was no brown coal technology at all, but that was not altogether true.

Origin and Classification

Dealing with the origin and classification of brown coals and lignites, Professor Bone said that, although there was some difference of opinion as to the origin and mode of formation of brown coals and lignites, from a chemical standpoint he could see no adequate reason for rejecting the orthodox view that they are intermediate forms between peat and bituminous coals, although our present ignorance of the subject imposed upon us the duty of expressing it guardedly as a provisional hypothesis. In this connection he was well aware of some recent criticism of this view by two German authorities, E. Donath and A. Lissner, who had concluded that coal is not to be regarded as necessarily derived from peat as found in recent deposits, or from common brown coals such as exist now, and they inclined to the view that brown coals have originated from vegetable debris different in character from that which, in carboniferous times, gave rise to our present bituminous coals. This was a view which demanded, and would no doubt receive, careful attention on the part of scientific investigators, but even if it proved to be correct, it would not necessarily, in his opinion, dispose altogether of the orthodox view, but rather only modify it.

Modern Theories

So far as modern research had been able to elucidate the nature of the later stages of the peat-to-coal transformation process, it would appear to have involved essentially the passage through what might be termed the pressure distillation process, whereby (1) de-watering, followed by (2) internal condensations of cellulosic aggregates characterised by simultaneous elimination of steam and carbon dioxide, with a consequent gradual increase in the carbon content of the coal, and (3) some amalgamation of this changed cellulosic or humic matter with molecular aggregates resulting from the similar transformation of proteid matter. It would appear that brown coals and lignites might be regarded as intermediate products between peat and bituminous coals, and from that point of view he would deal with them in the lectures.

Dealing with their characteristic properties, Professor Bone said that brown coal and lignites are characterised by the following properties, which, taken together, differentiate them completely from the geologically older bituminous coals, namely, in that (1) in the raw state they contain a large amount of water (*e.g.*, generally more than 20, and sometimes even as much as 50 per cent.); (2) on losing the same by air-drying they usually disintegrate, either crumbling to powder or developing well-marked laminar cracks; (3) they are naturally devoid of coking properties; (4) in the dry-ashless state they usually contain less than 75 per cent. of carbon and more than 20 per cent. of oxygen; and (5) on carbonisation at 900° they yield upwards of 45 per cent. of volatiles. Their physical texture varies considerably, but is easily distinguishable from that of bituminous coals. Thus, the most recent brown coals have either an amorphous earthy character or a very woody and fibrous structure, while the older varieties have either a laminated structure or a well-marked conchoidal fracture.

Pyridine in German Acetic Acid

Manufacturer's Claim against Chemical Importers

A CASE, having to do with discovery of a quantity of pyridine in acetic acid, was tried by Judge Cluer, in the Shoreditch County Court, recently. The plaintiffs were Henry Bright and Sons, Ltd., of Fraser Street, Grimsby, pickle manufacturers, and they sued Philip G. Palmer, Ltd., of 1-2, Chiswell Street, London, E.C., chemical importers, to recover £100 damages, for the defendants' failure to supply eleven casks of pure acetic acid, 80 per cent., as per contracts.

Mr. Henry King, director of the plaintiff firm, said they asked for quotation, and got one of £43 10s. a ton, nett, ex-wharf, London, barrels free. They booked two tons, and the quantity supplied came to £93 16s. 4d. So soon as it arrived they made pickles from it. Then they commenced to get complaints from customers and travellers, but they could not account for it. Finally they had an analysis made by Capt. Foster, their county analyst. He reported that the unpleasant taste was due to a tarry deposit, which on analysis proved to be pyridine. The defendants declined to accept responsibility for this, saying that complaint should have been made earlier. They added that they never kept acetic acid in barrels so long, especially if it was intended for edible purposes. Mr. King agreed that the acid came over in casks lined with paraffin wax, which was the correct way, but he would not admit that it was improper to keep the acid standing in the casks.

Capt. J. A. Foster, F.I.C., county analyst to the East Riding of Yorks, said he analysed the acetic acid, and found a small quantity of pyridine, of which it only needed a small quantity to give a sooty, varnishy, unpleasant flavour He explained that in Germany, Sweden, and other countries wood was distilled to make charcoal, and the distillate came over in a black tarry mass. The acetic acid was again distilled from this, leaving the residue in the retort. Then again it was distilled, and there was a base of a small quantity of lime, which would extract the last traces of the pyridine. So far as he could conjecture, this final distillation was improperly carried out. The pyridine could not have got there because the acid stood in the casks, as it did not come from oak barrels. If the acid ate through the paraffin wax and got at the barrels, it would cause discoloration, but would not account for the pyridine.

For the defendants, Mr. Ernest Palmer, managing director of the defendant firm, said the acetic acid came from a German firm at Hamburg, and it was of 80 per cent. purity. They sold twelve other barrels of the same consignment to three other firms of pickle makers, and had had no complaint. If the acid was kept in barrels, it rapidly became discoloured. They had a sample of the acid before it was shipped, and it was water-white.

Mr. E. J. Parry, analytical chemist, Great Dover Street, London, said that if the acid was so impregnated by pyridine as suggested by the analysis, it should have been detected by the plaintiffs, both by reason of the colour and the smell. It was quite improper to keep the acid in casks, and if it was intended to keep it, it should be imported in glass carboys. If kept, it would eat through the wax, and pick up impurities in the wood. His opinion was that the trouble was keeping it too long in the casks. In cross-examination he agreed that pyridine could not come from wax, or the casks; only an objectionable taste and a bad colour. He declared that it should never stay in the cask more than a month.

Judge Cluer said he thought the evidence of Capt. Foster had proved the presence of the pyridine in the acid, and he should award plaintiffs £36 14s. 7d. damages. Had they have claimed specially for the value of the acid, he would have allowed that also, but it had been claimed as general damages, and he could not allow it in that way. Judgment was entered accordingly for the plaintiffs for £36 14s. 7d. damages, and costs

Failure of a Chemical Merchant

A SITTING for the public examination of Mr. Louis Jules Fort, trading as F. Ford and Co., chemical and oil and colour merchant, Bush Lane House, Cannon Street, London, was appointed at the London Bankruptcy Court on November 22, before Mr. Registrar Hope, the statement of affairs showing liabilities £17,461, of which £15,562 were returned as expected to rank and assets consisting of bad book debts £4,266. Mr. E. Parke, Deputy Official Receiver, attended, and said that the debtor had not yet been examined on his statement of affairs, which would require amendment, because he had omitted to state the dates on which his debts were contracted or the nature of the consideration. Recent appointments that had been made for his preliminary examination had not been kept by him and he (the Official Receiver) had now received a letter from which it appeared that the debtor had left the country without the leave of the Court. In the letter the debtor said that he had returned to France in order to obtain employment and would be unable to attend the sitting now appointed for his public examination. He was under the order of his employers to travel to Spain. On the application of the Official Receiver, his Honour adjourned the examination until the next sittings and made an order on the debtor to amend his statement of affairs as required by the Official Receiver. He also requested the Official Receiver to inform the debtor that unless he attended the adjourned sitting his examination would then be adjourned *sine die* when the Official Receiver would be in a position to apply to the Court for a warrant for his arrest.

Chemical and Colour Merchants' Affairs

A MEETING of the creditors of Weeple Brothers, Ltd., chemical and colour merchants, London, was held recently at the offices of W. H. Cahill and Co., 22, Basinghall Street, E.C. Mr. E. Fitzpatrick, the liquidator in the voluntary liquidation of the company, reported that the liabilities to the trade creditors were only £314, while the assets consisted of office furniture £12, stock £4, book debts £11, and cash at bank £18 0s. 2d. After the expenses of the liquidation had been paid it was not thought that there would be any balance remaining for distribution amongst the creditors. The company was formed in December last to take over the business of chemical and colour merchants, which had been previously carried on by four partners. Two of the partners then retired. The company had a nominal capital of £1,000 divided into shares of £1 each. The subscribed capital was £302, Mr. Cahill being the holder of 300 shares while the brothers Weeple each held one share. At the inception of the company there was a surplus of assets over liabilities, but after meeting various expenses there was only about £100 left with which to carry on the business, and the present position was attributed largely to insufficient working capital. A resolution was passed confirming the voluntary liquidation of the company with Mr. Fitzpatrick as liquidator.

Analytical Chemist's Trading Losses

A MEETING of the creditors of H. Hardy, Ltd., analytical chemists, oil refiners, etc., Manchester, was held on November 20, when a statement of affairs was presented showing liabilities amounting to £4,418 0s. 5d., of which £4,153 2s. 1d. was due to trade creditors, while there were fully secured creditors for £1,045 and partly secured creditors £415. The assets consisted of sundry debtors estimated at £40, stock £439, surplus from security held by fully secured creditor £154 11s. 8d., fixtures, etc., estimated at £80, and cash in hand £3 6s. 6d., making a total of £717 3s. 8d., from which had to be deducted £1,077 1s. 3d. for preferential claims, leaving no assets available to meet the claims of the unsecured creditors. The assets were not sufficient to meet the claims of the preferential creditors and the position was regarded as most unsatisfactory. After some discussion it was decided to confirm the voluntary liquidation and that Mr. Yearsley be appointed as joint liquidator with a committee of inspection.

Wharfage Charges on Calcium Chloride

IN the Mayor's and City of London Court, on November 29, before Assistant Judge Shewell Cooper, Mr. John C. Bailey, trading as J. Bailey and Co., 36, Mark Lane, London, claimed the return of £27 17s. 9d. against the proprietors of Hays Wharf, Ltd., Southwark, paid under protest on September 4. Plaintiff's case was that 32 drums of chloride of calcium, belonging to him were carried by the Bruton Shipping Co. of 44, Leadenhall Street, per the s.s. *Horsham*, and were landed by them at Hibernia wharves, London Bridge, which belonged to the defendants, who declined to release them except on payment of an account owing by the Bruton Shipping Company. Assistant Judge Shewell Cooper said it was a case of some difficulty, but on the whole, he must find for the plaintiffs, with costs.

From Week to Week

NEW PREMISES have been secured by the Pepsodent Company, and their address is now 42, Southwark Bridge Road, London, S.E.1.

LIEUT.-COL. R. A. THOMAS, one of His Majesty's Inspectors of Explosives, has been appointed an additional member of the Explosives in Mines Research Committee.

IN VIEW of a dispute with their employees, the Badische Anilin und Sodafabrik are reported to have closed all their works, thus throwing over 20,000 men out of employment.

MESSRS. J. AND A. CHURCHILL expect to publish shortly a new work entitled "The Theory of Emulsions and Emulsification," by Dr. W. Clayton, with a foreword by Professor F. G. Donnan, F.R.S.

MR. ROBERT MOND, having tendered his resignation of the chairmanship of the Mond Nickel Co., owing to ill-health, Sir Alfred Mond, M.P., has accepted the invitation of the board again to become the chairman.

A SON was born on November 25, at Davenham, near Northwich, to Mr. and Mrs. T. W. Stainer Hutchins. Mr. Stainer Hutchins is managing director of Electro Bleach and By-Products, Ltd., of Middlewich.

MR. HUGHES-PRICE, managing director of the Phœnix Works, Swansea, and chairman of the South Wales Patent Fuel Manufacturers' Association, discussing the depression in the industry, attributed it to the high price of pitch.

AT THE ANNUAL MEETING of the Liverpool University Court, on Wednesday, it was stated that Professor Blair Bell and his assistants were investigating a new process for the treatment of cancer. Colloidal lead has been employed in the experiments.

A MEETING of the Manchester College of Technology Evening Students' Chemical Society was held on November 21, the chair being taken by the Principal of the College. Professor F. L. Pyman, F.R.S., delivered his presidential address on "The Constitution of Pilocarpine."

THE FOLLOWING were among the degrees awarded by the Senate of London University on November 15:—D.Sc. in Chemistry (Internal Students): S. R. Illingworth, Royal College of Science; D.Sc. in Physics (External Students): E. V. Appleton, St. John's College, Cambridge.

ANNOUNCEMENT is made by the Royal Society that applications for the Government grant for scientific investigations for the year 1923 must be made to the Royal Society by January 1 next. Particulars and application forms are obtainable from the Clerk to the Government Grant Committee, Royal Society, Burlington House, London.

AT A MEETING of the London Section of the Society of Chemical Industry, to be held on December 4, at the Engineers' Club, 39, Coventry Street, London, W.1, at 8 p.m., the following paper will be read: "The Valuation of Insoluble Phosphate by Means of a Modified Citric Acid Test," by Dr. G. S. Robertson, F.I.C., and F. Dickinson.

RECKITT AND SONS, LTD., announce that, owing to expansion of business, they have removed their London offices to 40, Bedford Square, W.C.1, from 150, Queen Victoria Street, E.C.4, which has been their address for upwards of forty years. The telegraphic address will be "Blacklead, Westcent, London," and the telephone number "Museum 8321."

AT THE NEXT meeting of the Chemical Society, to be held on Thursday, December 7, the following papers will be read: "The isoelectric condition of gelatin," by S. O. Rawling and F. Clark; "Studies on metal hydrides: the electrolytic formation of stibine in sulphuric acid and caustic soda solution," by H. J. S. Sand, E. J. Weeks, and S. W. Worrell.

LAXEY LEAD MINES, near Douglas, were the scene last week of a fire which resulted in the destruction of some of the central buildings. The fire apparently originated in the grinding mill and within a few minutes the washing floors were ablaze. The water wheel which drives the crushing machinery was with difficulty saved. The mines were only reopened three months ago.

CORNISH KAOLIN, LTD., announce that the furnaces of the large new dry at Bodmin Road Station, which has been under construction for the last twelve months, were lighted on November 18 by Captain A. H. Moreing, the newly-elected M.P. for the Camborne Division. This new dry, in conjunction with the recent extension of the refining section, will, it is stated, largely increase the company's output of china clay.

MR. ALEXANDER H. PICKERING, chemical merchant, of 39 Tower Hill, London, is president of a new company incorporated in New York. The company, which will be known as Alex. Pickering and Co., Inc., has a nominal capital of $50,000 and has offices at 136, Liberty Street, New York. Mr. C. S. Wehrly, who is vice-president and treasurer, will act as manager of the New York office, Mr. Pickering having returned to this country.

A NEW company trading under the name of LAZARD-GODCHAUX DYES CHEMICALS, LTD., has been formed to carry on business in aniline colours and chemicals. Mr. G. Beltrami, who for many years was associated with the Lazard-Godchaux Co., Ltd., has accepted the post of managing director. The new company's address is Walter House, 422, Strand, London, W.C.2 (telegrams, "Anilaza, London"; telephone, Gerrard 4755).

AT A RECENT MEETING of the Shell Union Oil Co. Sir Henry W. A. Deterding, managing director of the Royal Dutch, was elected president in succession to Mr. William H. Allen, who has retired. The directorate was also increased by five members from 20 to 25, and five representatives of the Royal Dutch were made directors. The five additional directors elected, representing the Royal Dutch interests, were Messrs. J. B. A. Kessler, Alexander Mackay, Walter H. Samuel, Dr. A. Phillips, and Sir Robert Waley-Cohen.

A STAFF fancy dress dance arranged by the National Benzole Co., Ltd., and the Agwi Petroleum Corporation, which took place at the Wharncliffe Rooms, Great Central Hotel, Marylebone, proved to be a very successful evening and a number of valuable prizes were given for the most original fancy dresses. Mr. A. Read, vice-chairman of the National Benzole Co., Ltd., speaking on behalf of the combined directorate, welcomed the opportunity of becoming more personally acquainted with members of both staffs.

DEALING in his annual report with metalliferous mines, the Chief Inspector of Mines for Scotland states that the total number of persons employed in and about the mines was 796, a decrease of 180 as compared with the previous year. The number of mines at work was 20 as compared with 22 in 1920. The quantity of mineral raised was 108,839 tons, a decrease of so large a tonnage as 104,736. The decrease ranged over all the minerals actually raised. The output returns, he states, suggest collapse of the metalliferous industry, but it is to be hoped this is only temporary.

A FIRE which at one time threatened to have very serious results broke out at the works of the Southern Cotton Oil Co., Trafford Park, Manchester, on November 26. The fire originated in the press room, which is situated above the refinery department, and it was not long before the flames had got a good hold of the roof and other parts of the building. The efforts of the Manchester Fire Brigade to keep the fire from reaching other departments were, however, successful. Within the danger zone were a number of oil tanks, but owing to the large quantity of water sprayed over and around them, these were not involved.

THE ZINC CORPORATION announce that the treatment of the remaining zinc tailings is drawing to a close, and next month operations thereon will be further reduced to one shift only, on which reduced scale the working costs will be very much increased. In consequence of this, and influenced by the desire to retain the services of those employees who have been on the staff of the company for many years, it has been decided to resume mining operations for a trial period of six months. It is hoped that before this period has elapsed a review of the Edmunds award will have been obtained, and that the working conditions will justify the continuance of mining operations.

AT a meeting of the Glasgow Medical Lunch Club, on November 23, Mr. F. W. Harris, the Glasgow City Analyst, described "Modern Methods of Sewage Disposal." After outlining the various processes that had been employed, and the later methods of activated sludge by the introduction of particular insects into the media, he said that this system was first employed in Glasgow last year, and by August of this year they had evidence of the successful colonisation of five filters. The eeffct of these insects was to save Glasgow Corporation thousands of pounds. Although the practicability of the process was established it was still in its infancy, and the future held promise of considerable reduction in working costs. There was also the question of the use of the sludge as a fertiliser. It possessed high manurial value, whereas the older forms of sludge possessed little manurial value.

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Abstracts of Complete Specifications

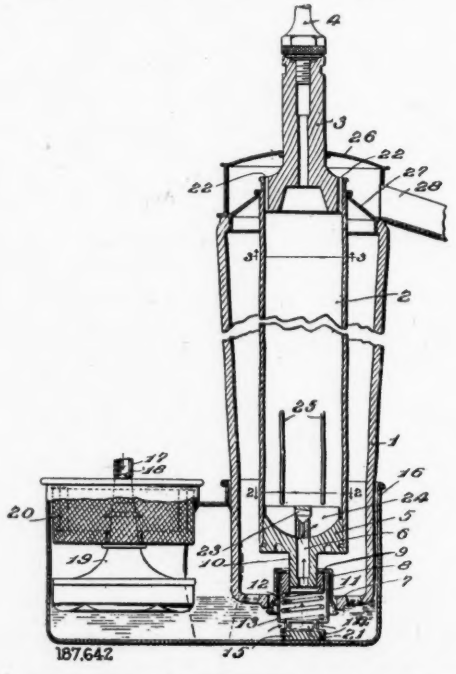
187,636. CHROMIUM COMPOUNDS, MANUFACTURE OF. C. K. Potter, 1, St. George's Square, St. Annes-on-Sea, and F. Robinson, 225, Green Lane, Bolton. Application date, December 30, 1921.

The process is for the production of chromium compounds from chrome iron ore. Chrome iron ore has been treated with strong sulphuric acid and an oxidising agent such as chromic acid (which may be obtained by adding chromium sulphate and electrolysing the mixture). The chromic acid was in sufficient quantity to oxidise the iron, but in the present process a much smaller quantity of chromic acid is used. Further it is found that if the mixture is heated above 150° C., the chromium sulphate is obtained in the form of a grey powder which is almost insoluble in water. Any of the iron sulphate which is also rendered insoluble may be brought into solution by reducing agents. Other oxidising agents than chromic acid may be used, such as potassium permanganate, manganese dioxide, red lead, or a chromate or bichromate. The product of the reaction is treated with hot water, and the liquor which contains sulphuric acid, aluminium sulphate, some ferrous sulphate, magnesium sulphate, and chromium sulphate, is treated with a reducing agent such as ferrous sulphide, iron, zinc, or sulphuretted hydrogen, to reduce the ferric sulphates. The precipitate of insoluble chromium sulphate is filtered, washed and dried. The solution is evaporated until iron, aluminium and magnesium sulphates are separated, and the solution of sulphuric acid and chromium sulphate is returned to the process.

The insoluble chromium sulphate may be converted into chromium oxide by heating to redness. Alternatively the mixture of chromium and iron sulphates is heated with an excess of coal in a reducing atmosphere, and the resulting mixture of chromium oxide and iron sulphide is treated with acids to dissolve the iron sulphide. In another alternative, the mixture of chromium and iron sulphates is boiled with sodium or potassium sulphide, and the precipitate is washed, dried and ignited in a reducing atmosphere. The iron sulphide may be dissolved with acid, leaving chromium oxide. In another alternative, the chromium and iron sulphates are heated in a muffle furnace to obtain a mixture of ferric and chromium oxides. The ferric oxide is then reduced by heating with coal or other reducing agent, and may then be dissolved out by acids or removed by magnetic separation. To obtain chromium hydroxide and/or basic carbonate, the insoluble sulphate is boiled with caustic soda or potash, sodium or potassium carbonate or sulphide, baryta, lime, calcium carbonate, zinc carbonate, or ammonia. The residue of chromium hydroxide and basic carbonate is filtered, washed and dried. To obtain chrome alum, the chromium hydroxide may be dissolved in sulphuric acid and mixed with potassium or ammonium sulphate. Alternatively, the insoluble chromium sulphate is dissolved in dilute sulphuric acid in the presence of ferric oxide and chromic acid. The ferric sulphate is reduced to prevent isomorphous crystallisation, and the alum may be obtained by adding potassium sulphate. To obtain potassium or sodium chromate, the chromium oxide or insoluble sulphate is oxidised by heating in air, with or without other oxidising agents. To obtain chromium acetate the insoluble chromium sulphate is boiled with a strong solution of barium or lead acetate, and the precipitate of barium or lead sulphate filtered off. To obtain chromium chloride, the insoluble chromium sulphate is similarly treated with barium chloride.

187,639. CELLULOSE DERIVATIVES, MANUFACTURE OF. H. Dreyfus, 8, Waterloo Place, London, S.W.1. Application date, April 19, 1921.

The process is for the manufacture of cellulose ethers by treating cellulose or its conversion products with etherifying agents in the presence of caustic alkali or other inorganic base. Specifications Nos. 164,374-5-7 (see THE CHEMICAL AGE, vol. v, p. 75) describe a process of this kind for treating cellulose or near conversion products not soluble in alkali, with a quantity of water which is so restricted that it is from 0·5 to 1·5 times the weight of the cellulose; the total alkali used is at least equal to and may be any proportion up to 19 times the weight of water present. It is now found that the etherifying reaction can be facilitated by further reduction of the proportion of water, and the quantities of alkali and etherifying agent (such as diethyl sulphate) may approach the theoretical proportions. This reduction of the water content is obtained by the addition of reagents capable of binding water by chemical combination. The proportion of water may then be 0 to 0·5 of the weight of the cellulose or conversion product, and the alkali may have the same proportion to the water as before. The water-binding agent may be a metal or metal compound which forms an oxide or hydroxide in contact with water, such as oxides of sodium, potassium, calcium, barium, magnesium, calcium hydride, magnesium hydride, metallic calcium, barium, or sodium, sodamide or sodium ethylate. These substances not only remove the water present but also the water which is formed by the action of the base on the cellulose or conversion product. These water binding agents are preferably added in the presence of indifferent diluents, such as benzol, toluol, carbon tetrachloride, ether, ligroin or benzene. These diluents may be added in large quantities to absorb the heat which is generated by the reaction between the alkali metals or the like, and the water. If alkali metals or alkali alcoholates are used, the cellulose or conversion product should contain the normal quantity of water, to avoid decomposition or destruction of the cellulose molecule. The resulting caustic alkali serves as the base for the etherification process. In an example, 162 parts of cellulose containing 25-36 parts of water are mixed, in the presence of 500-1,000 parts of benzol, with 93-124 parts of sodium oxide, the mixture being strongly cooled. The water is thereby abstracted from the cellulose, and the caustic alkali produced is intimately mixed with the cellulose. The necessary quantity of diethyl sulphate is then added, and the temperature is preferably kept below 55° C. Other examples are given in which different proportions of sodium oxide are used, or alternatively calcium oxide, and also in which dimethyl sulphate is used as the etherifying agent.



187,642. CENTRIFUGAL EMULSIFIERS. W. P. Thompson, Liverpool. From the Sharples Separator Co., West Chester, Pa., U.S.A. Application date, April 27, 1921.

This apparatus is particularly suitable for emulsifying fats and oils. An emulsifying vessel 2 is of relatively small

diameter and is suspended from a spindle 4 which is rotated at 16,000-20,000 revolutions per minute. The lower end of this vessel is closed by a plate 5 provided with an inlet opening 6 in a projecting portion 10, which is fitted with a lead collar 11. The outer casing 1 is formed with an opening 7 containing a flanged cylinder 8 into which the extension 10 projects. The opening in the member 8 is slightly larger than the extension 10, and the collar 11 is pressed upwards by a spring 12 so that the vessel 2 determines its own axis of rotation when the lower end is allowed some lateral movement. The mixture which is to be emulsified is supplied through a pipe 17 to a vessel 16, and its level in this vessel is determined by a float 19 carrying a valve 18. The vessel 2 is provided with outlets 22 through which air escapes during rotation, thus creating a suction within the vessel which draws in the mixture at the bottom. The rate of discharge of air through the openings 22 varies with the speed of the vessel, so that the rate of supply of mixture to the vessel is automatically varied in accordance with its speed. The mixture is directed laterally by means of a cone-shaped spreader 23, and its rotation is ensured by radial partitions 24. The mixture is thus directed with great force against the side walls of the vessel, and is divided into very small particles and emulsified. The vessel 2 is preferably long and narrow, so that the emulsion flows along its surface to the outlets 22, while any solid particles are retained on the walls by centrifugal force. The openings 22 are sufficiently large to allow a free discharge of the emulsion into the outlet 28.

187,660. Soap, Process for the Manufacture of. M. T. Khorassany, 62, Hadikgasse, Vienna XIII., Austria. Application date, June 22, 1921.

The object is to obtain a soap paste with slight water content, which remains permanently plastic on exposure to the air, and which may be mixed with ten times its weight of water while retaining the consistency of soap. A mixture of cocoanut or palm oil 50 parts, and pressed tallow 50 parts, is saponified with a considerable excess of soda lye, *e.g.*, 100–200 per cent. of the weight of the stock. The soda lye is preferably of such concentration that each part of the stock contains 0·75 parts of caustic soda, 0·265 parts of sodium carbonate, and 8–10 parts of water. After complete saponification the mixture is concentrated by heat with the aid of a multiple stirrer, until a fine granular mass is obtained which is almost free from water, and is a homogeneous mixture of sodium-fatty-acid compounds with excess of alkali and glycerin. This soap may be converted into a washing medium by mixing with ten times its weight of boiling water, yielding a paste which cools to the consistency of soap.

187,732. Inks, Water Colour Paints and Like Compositions. Plauson's (Parent Co.), Ltd., 17, Waterloo Place, Pall Mall, London, S.W.1. From H. Plauson, 14, Huxter, Hamburg, Germany. Application date, July 30, 1921.

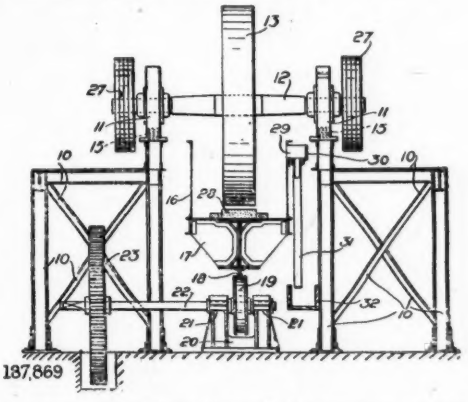
The object is to obtain inks and like compositions without the use of expensive raw materials such as tannin or gallic acid, or concentrated organic dyestuffs. It is found that if a colloidal solution of clay, kaolin, rock phosphate, zirconia earths, metal oxides, lime, iron compounds, earth colours, lakes, etc., is mixed with a relatively small proportion of a soluble ink base or organic dyestuff, a colloidal coloured solution of great intensity is obtained. The colloidal solution is prepared by disintegrating the raw material, *e.g.*, clay or zirconium oxide, in the colloid mill described in Specification No. 155,836 (see The Chemical Age, Vol. IV., p. 313), and the colloidal solution may be treated in the mill with an organic dye in the presence of a protective colloid such as gum arabic, plant gum, lime and acid free sulphite liquor, water-soluble silicates, and in the case of copying inks, glycol, glycerin or the like. Decomposition of these protective colloids may be prevented by adding a very small quantity of thymol, phenol, cresol or resorcinol. The clay may be replaced by coloured insoluble substances such as ultramarine or other earth colours or lakes. Examples are given.

187,810. Magnetic Sand or Finely Divided Iron Ore, Process for the Treatment of. A. Naito, 2174, Araijuku, Ebara-Gun, Tokyo, Japan. Application date, September 29, 1921.

The raw material is mixed with powdered coal and heated in a closed vessel to 1,000° C. to obtain a coke containing finely divided ore. This is treated in heaps in the open with sulphur dioxide or chlorine passed through it from below, to convert the iron into sulphate or chloride. Alternatively, the heaps may be saturated with caustic soda solution or sea water to produce soluble iron salts. The mass is then exposed to the air until the soluble salts are partly rendered insoluble by conversion into oxide, hydroxide and carbonate. The agglomerated material thus obtained may be treated in a smelting furnace with the addition of silica and lime.

187,869. Wet-crushing Ores and Other Materials, Method and Apparatus for. R. P. Whitelaw, 59 and 60, Broad Street Avenue, London, E.C.2. Application date, November 24, 1921.

This apparatus for wet crushing ores is particularly applicable to the treatment of ore containing gold, and its extraction by the cyanide process. The apparatus comprises an annular trough supported on power-driven rollers and having a series of crushing rollers arranged at intervals around the trough. The ore passes under the rollers in succession, and the crushed material is removed at each stage so that only the partly broken material passes on to the next roller. The illustration



shows a transverse section through the annular trough. The shaft 12 of the grinding roller 13 is supported in bearings 11 mounted on frames 10. The height of each roller is determined by the number of packing pieces 15 arranged below the bearings, so that the space for the passage of material below each roller may be made to decrease progressively from the first roller which receives the material. The trough is supported on rollers 19, some of which may be driven by a motor through gearing 23. The effective weight of any crushing roller may be increased by adding discs of heavy material 27 to the projecting ends of each shaft. The trough is provided with wearing faces 28, which are made in sections and may be renewed. The ore which is crushed by each roller is floated off by means of the liquid in the trough and discharges over weirs 29 arranged between adjacent rollers. The liquid passes through the pipe 31 to another annular trough 32 from which it may pass to a reservoir for separation of the crushed material. The material in the trough 16 is agitated between each pair of rollers by a liquid pressure stream, so that the finely crushed material is extracted and floated off. The quantity of ore to be treated is thus gradually diminished as it passes through the apparatus.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention :—167,752 (Rheinisch-Nassauische Bergwerks- and Hütten Akt.-Ges.) relating to production of chemically pure hydrochloric acid, see Vol. V, p. 464 ; 170,572 (Koppers Co.) relating to purification of gases, see Vol. V, p. 774 ; 174,370 and 177,496 relating to rendering crude phosphates soluble, see Vol. VI, pp. 433 and 706.

International Specifications not yet Accepted

186,572. Fatty Acids From Waste Cellulose Materials. Lefranc et Cie., 8, Place Edouard VII, Paris. International Convention date, September 26, 1921.

Disintegrated wood waste is hydrolysed by means of dilute sulphuric acid and superheated steam, and the acid liquor is neutralised with lime or chalk. The impure sugar

solution is extracted and excess of milk of lime is added to remove gums, resins, mucilages, etc. The solution may be further purified by filtering through animal charcoal, and is then treated with ferments obtained by inoculating sugar solutions containing mineral salts with bacilli of the intestinal digestion of herbivora or contained in soil. The sugar is thus converted into butyric, acetic, propionic, valeric, and caproic acids and the mixture is distilled *in vacuo* with sulphuric acid, hydrochloric acid or sodium bisulphate. The organic acids distil off and are separated fractionally.

186,589. LIXIVIATING ZINC-CONTAINING MATERIALS. F. Hansgirg, Graz, Austria. International Convention date, September 30, 1921.

The material is contained in a funnel-shaped vessel having a tubular extension projecting downwards and closed at the bottom by a valve. The lixiviating solution, which may be weak acidified electrolyte such as zinc sulphate, may be introduced through a tube projecting downwards into the funnel nearly to the bottom of the extension. The resulting zinc solution overflows into a pipe at the top, and the residue is drawn off by a valve at the boctom.

186,606. HYDROFLUORIC ACID. H. Howard, 1,300, Guardian Building, Cleveland, Ohio, U.S.A. International Convention date, September 29, 1921.

Fluorspar containing silica is treated with sulphuric acid and the hydrofluoric acid evolved is passed through a hot solution of potassium sulphate. The silicon fluoride and hydrofluosilicic acid present in the gases are thereby absorbed to form a precipitate of potassium silicofluoride. The hydrofluoric acid gas is not absorbed by the hot solution, and is obtained free from silicon compounds. The precipitate is filtered off and the sulphuric acid solution is used again for treating fluorspar. The potassium silicofluoride may be treated with sulphuric acid, the hydrofluosilicic acid distilled off, and the potassium sulphate recovered for use again by leaching from the silica.

186,616. DISTILLING TAR. F. Duplan, 58, Rue Bobillot, Paris. International Convention date, September 29, 1921.

Vegetable tar is mixed with a powdered or granular substance, such as calcium carbonate, sand, coke, or charcoal, and may then be distilled in shallow retorts without frothing. Products may be obtained which are suitable for use as fuel for internal combustion engines.

LATEST NOTIFICATIONS.

189,091. Manufacture of aromatic hydrocarbons. Barrett Co. November 14, 1921.

189,107. Manufacture of aromatic aldehydes. Barrett Co. November 18, 1921.

189,114. Method of purifying solutions of viscose and similar solutions of cellulose. Naamlooze Vennootschap Nederlandsche Kunstzijdefabriek. November 18, 1921.

189,132. Process for the production of amorphous finely-subdivided litharge. Goldschmidt Akt.-Ges., T. November 15, 1921.

189,136. Continuous process and apparatus for the production of large quantities of absolute alcohol. Barbet et Fils et Cie., E. November 15, 1921.

189,148. Process of producing decolorising carbon. Algemeene Norit Maatschappij. November 19, 1921.

Specifications Accepted, with Date of Application

163,046. Catalysts, Production of. Nitrogen Corporation. May 8, 1920.

169,990. Compound minerals, Process for treating—and apparatus therefor. G. Freydier-Dubreul. October 5, 1920.

171,970. Ammonia, Synthesis of. L'Air Liquide Soc. Anon. pour l'Etude et l'Exploitation des Procèdes G. Claude. November 20, 1920.

175,649. Saturators for use in the recovery of salts from the gases of dry distillation. H. Egeling. February 17, 1921.

188,354. Bitumen, Manufacture and treatment of. H. Burnie. (*Bitumul-Matita Soc. Anon. Romana*). July 4, 1921.

188,362. Filter press. Plauson's (Parent Co.), Ltd. (*H. Plauson*). July 7, 1921.

188,370. Gas from electrolytic apparatus, Method of increasing the output of. E. Vesme. July 29, 1921.

188,376. Aromatic cyan-mercury compounds, Process of producing. A. Klages and Saccharin-Fabrik Akt.-Gas vorm. Fahlberg, List, and Co. August 4, 1921.

188,402. Crude naphtha, Fractional distillation of—and apparatus therefor. G. E. Walker. August 11, 1921.

188,424. Rotary calcining furnaces. H. Stehmann. August 26, 1921.

188,454. Alkali salts from felspar and like minerals, Process for obtaining. Plauson's (Parent Co.), Ltd. (*H. Plauson*). September 16, 1921.

188,494. Hydrogen or gases rich in hydrogen, Manufacture of. J. H. West, A. Jaques and C. B. Tully. October 13, 1921.

188,521. C. C-isopropylallyl-barbituric acid, Process for the manufacture of a compound of. H. R. Napp. (*F. Hoffmann-La Roche and Co. Akt.-Ges.*). November 1, 1921.

188,539. Filtering apparatus. R. Timm. November 18, 1921.

188,558. Titanium-nitrogen compounds, Process of producing. F. von Bichowsky and J. Harthan. December 7, 1921.

188,575. Coal tar, petroleum, and other liquids, Apparatus for distilling. F. J. E. China and Burt, Boulton, and Haywood, Ltd. December 28, 1921.

188,587. Sulphate of ammonia, Steam and self-discharging apparatus for neutralising. G. Royston. January 10, 1922.

188,607. Producer gas, Process of and apparatus for the manufacture of—with simultaneous recovery of high yields of by-products. W. Beswick and N. E. Rambush. February 21, 1922.

Applications for Patents

Algemeene Norit Maatschappij and General Norit Co., Ltd. Process of producing decolorising-carbon. 31,686. November 20. (Holland, November 19, 1921.)

Amato, R. P. Treatment of petroleum, etc., and earths or soils. 32,059. November 23.

Becco Engineering and Chemical Co., Ltd., and Grant, E. D. Treatment of waters containing alkaline bicarbonates, etc. 31,977. November 22.

Bloxam, A. G., and Chemische Fabrik Griesheim-Elektron. Manufacture of azo dyestuffs. 32,080. November 23.

Braithwaite and Co., Ltd., H., and Smith, F. W. H. Crystallisation of matter in solution from liquids. 31,877, 31,878. November 22.

British Cyanides Co., Ltd., and Rossiter, E. C. Manufacture of caustic alkali and metallic chlorides. 32,294. November 25.

Compagnie pour la Fabrication des Compteurs et Matériel d'Usines à Gaz. Mercury watt-hour meter. 31.710. November 20. (France, December 3, 19,21.)

Davidson, W. B. Gas purification. 32,317. November 25.

Dietrich, W. Purification of water. 31,698. November 20.

Du Pont de Nemours and Co., E. I., and Nobel Industries, Ltd. Production of urea derivatives. 32,095. November 23.

Edwards, G. W. Treatment of oxydised ores, etc. 31,685. November 20.

Fairweather, H. G. C., and Federal Phosphorus Co. Joint production of phosphoric acid and ferro-phosphorus. 31,973. November 22.

Haller, J. G., and McLaren, G. Utilisation of waste gases from furnaces. 31.940. November 22.

Jackson, W. J. Mellersh- and Koppers Co. Treatment of alkali salt solutions. 31,848. November 21.

Loriette, P. Production of liquid fuel mixtures with alcohol as basis. 31,786. November 21. (France, November 21, 1921.)

Lucas, O. D., and V. L. Processes, Ltd. Treatment of hydrocarbons and their derivatives. 32,219. November 24.

Morgan, G. U. Oil-fuel burners. 32,274. November 25.

Nicholson, T. Neutralising ammonium sulphate. 32,134. November 24.

Rheinische Kampfer-Fabrik Ges. Production of inactive menthol. 31,714. November 20. (Germany, November 23, 1921.)

Wilkinson, R. J. Chemical process for facilitating combustion of coal dust in furnaces, etc. 32,120. November 24.

Patents Court Cases

AN application has been made under Rule 7 of the Patents (Treaty of Peace) Rules, 1920, by Synthetic Ammonia and Nitrates, Ltd., of Billingham, Stockton-on-Tees, for the grant of a licence in respect of the following patents :—27,955/1912 relating to the manufacture of hydrogen ; 28,200/1912 relating to carrying out operations with hydrogen under pressure and at a raised temperature ; and 9,271/1914 relating to the removal of carbon monoxide from gas mixtures. All these are in the name of J. Y. Johnson (*Badische Anilin und Soda Fabrik*). Any notice of opposition must be given by December 20, 1922.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to* THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers ; those interested in close variations in prices should study the market report.

LONDON, November 30, 1922.

THE chemical trade this week has been rather on the quiet side, and orders are in the main for small quantities.

The demand in the textile industry has been rather poor ; prices on the whole, however, continue firm, and the undertone is quite healthy.

Export business has been more active, and there is quite a fair volume of inquiry in the market.

General Chemicals

ACETONE remains practically unobtainable, and the price is inclined to go still higher.

ARSENIC has also experienced a further sharp advance in price, and it is now exceedingly difficult to secure supplies for anything like prompt delivery.

ACID ACETIC is in fair request, and the price is without change.

ACID CITRIC is easy, with little demand.

ACID FORMIC has been in good supply, and the demand is well maintained.

ACID LACTIC moves steadily into consumption.

ACID OXALIC has firmed up in value, and the demand has improved.

ACID TARTARIC.—Only a small demand, and the price is in buyers' favour.

BARIUM CHLORIDE continues to advance slightly, but the demand is only moderate.

CASEIN.—This market shows a great advance, with supplies short, and further advances are anticipated during the coming months.

CREAM OF TARTAR is still under the influence of second hands, but makers are inclined to be firmer in their ideas.

FORMALDEHYDE has again advanced, and it would appear as though we had not yet seen the top of this market.

LEAD ACETATE is without change, and the demand is good.

LEAD NITRATE is only in small request, without change in value.

METHYL ALCOHOL is very scarce and the price extremely firm.

POTASSIUM CARBONATE in very poor request, and ample supplies are available.

POTASSIUM CAUSTIC continues in buyers' favour, with little business passing.

POTASSIUM PERMANGANATE has been in slightly better request, but orders are in the main for moderate quantities.

POTASSIUM PRUSSIATE.—A substantial business has been booked for the early months of next year at full figures.

SODIUM ACETATE is again firmer and inclined to be scarce.

SODIUM BICHROMATE moves steadily into consumption at increasing figures.

SODIUM HYPOSULPHITE is only in moderate request.

SODIUM NITRATE.—The price is unchanged, with a moderate demand.

SODIUM PRUSSIATE.—The value is well maintained, and a considerable business has been concluded for the first half of next year.

ZINC OXIDE is scarce and firm.

Coal Tar Intermediates

Business continues on quiet lines, and there is little general improvement to be expected until the New Year.

ALPHA NAPHTHOL continues firm with small stocks available.

ALPHA NAPHTHYLAMINE is featureless.

ANILINE OIL.—Some home business is passing.

BENZIDINE BASE is without change in price, and business on home account continues steady.

BETA NAPHTHOL is unchanged.

BETA NAPHTHYLAMINE is firm, with some home inquiry.

DIPHENYLAMINE is very firm, and home business is in the market.

METANITRANILINE.—Inquiry both on home and export account.

H. ACID is without change in price, and some home orders have been placed.

METATOLUYLENEDIAMINE.—Some home inquiry has been received.

NITRONAPHTHALENE is a small steady trade.

PARAPHENYLENEDIAMINE is firm.

TOLUIDINE has been the object of some small interest.

Coal Tar Products

The steady tone of the market in coal tar products is being maintained, and an active demand exists for creosote oil, supplies for forward delivery being scarce, and prices having an upward tendency.

90's BENZOL is steady, and is worth about 1s. 8d. to 1s. 9d. per gallon on rails in the North, and about 1s. 11d. to 2s. per gallon on rails in London.

PURE BENZOL is uninteresting, and is worth about 2s. per gallon in the North, and 2s. 3d. to 2s. 4d. per gallon in the South.

CREOSOTE OIL is active, with a good demand for forward. It is worth about 6¼d. to 6½d. per gallon in the North, and 7¼d. to 7¾d. per gallon in the South.

CRESYLIC ACID.—There is little business doing. The pale quality is quoted at 1s. 10d. to 2s. per gallon on rails, and the dark quality 95/97% is worth about 1s. 8d. to 1s. 9d. per gallon on rails.

SOLVENT NAPHTHA is fairly steady at 1s. 8d. to 1s. 9d. per gallon in the North, and about 1s. 10d. to 1s. 11d. per gallon on rails in the South.

HEAVY NAPHTHA has a poor inquiry, and is quoted at 1s. 6d. per gallon on rails.

NAPHTHALENE.—The crude qualities are in fair demand, and are worth about £7 to £8 per ton on rails, while hot pressed is worth about £8 10s. per ton.

PITCH.—The market remains quiet and inactive. To-day's quotations may be taken as 110s. to 115s., f.o.b. East Coast, and 115s. to 120s., f.o.b. London, both for prompt and forward delivery.

Sulphate of Ammonia

There is no change to report.

Current Prices

Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	1	8	to	0	1	10
Acetone oil	ton	80	0	0	to	82	10	0
Acetone, pure	ton	130	0	0	to	135	0	0
Acid, Acetic, glacial, 99–100%	ton	67	0	0	to	68	0	0
Acetic, 80% pure	ton	43	0	0	to	44	0	0
Arsenic, liquid, 2000 s.g.	ton	67	0	0	to	70	0	0
Boric, cryst.	ton	55	0	0	to	60	0	0
Carbolic, cryst. 39–40%	lb.	0	0	7	to	0	0	7½
Citric	lb.	0	1	9	to	0	1	10
Formic, 80%	ton	59	0	0	to	60	0	0
Gallic, pure	lb.	0	3	0	to	0	3	3
Hydrofluoric	lb.	0	0	7½	to	0	0	8½
Lactic, 50 vol.	ton	41	0	0	to	43	0	0
Lactic, 60 vol.	ton	43	0	0	to	45	0	0
Nitric, 80 Tw.	ton	27	0	0	to	29	0	0
Oxalic	lb.	0	0	7½	to	0	0	7½
Phosphoric, 1.5	ton	40	0	0	to	42	0	0
Pyrogallic, cryst.	lb.	0	5	9	to	0	6	0
Salicylic, Technical	lb.	0	1	0	to	0	1	2
Salicylic, B.P.	lb.	0	1	4	to	0	1	5
Sulphuric, 92–93%	ton	6	10	0	to	7	10	0
Tannic, commercial	lb.	0	2	3	to	0	2	9
Tartaric	lb.	0	1	2½	to	0	1	3
Alum, lump	ton	10	0	0	to	10	10	0
Alum, chrome	ton	27	0	0	to	28	0	0
Alumino ferric	ton	9	0	0	to	9	5	0
Aluminium, sulphate, 14–15%	ton	10	10	0	to	11	0	0
Aluminium, sulphate, 17–18%	ton	11	10	0	to	12	0	0
Ammonia, anhydrous	lb.	0	1	6	to	0	1	8
Ammonia, .880	ton	33	0	0	to	35	0	0
Ammonia, .920	ton	21	0	0	to	23	0	0
Ammonia, carbonate	lb.	0	0	4	to	0	0	4½

	Per	£	s.	d.		£	s.	d.
Ammonia, chloride	ton	60	0	0	to	65	0	0
Ammonia, muriate (galvanisers)	ton	35	0	0	to	37	10	0
Ammonia, nitrate (pure)	ton	35	0	0	to	40	0	0
Ammonia, phosphate	ton	65	0	0	to	68	0	0
Ammonia, sulphocyanide	lb.	0	1	10	to	0	2	0
Amyl acetate	ton	175	0	0	to	185	0	0
Arsenic, white, powdered	ton	65	0	0	to	68	0	0
Barium, carbonate, 92–94%	ton	15	0	0	to	16	0	0
Barium, Chlorate	ton	65	0	0	to	70	0	0
Barium Chloride	ton	19	0	0	to	20	0	0
Nitrate	ton	27	10	0	to	30	0	0
Sulphate, blanc fixe, dry	ton	20	10	0	to	21	0	0
Sulphate, blanc fixe, pulp	ton	10	5	0	to	10	10	0
Sulphocyanide, 95%	lb.	0	1	0	to	0	1	3
Bleaching powder, 35–37%	ton	12	0	0	to		—	
Borax crystals	ton	28	0	0	to	32	0	0
Caffein	lb.	0	13	0	to	0	14	0
Calcium acetate, Brown	ton	10	10	0	to	11	10	0
,, ,, Grey	ton	15	10	0	to	16	0	0
Calcium Garbide	ton	16	0	0	to	17	0	0
Chloride	ton	6	0	0	to		—	
Carbon bisulphide	ton	50	0	0	to	52	0	0
Casein technical	ton	95	0	0	to	100	0	0
Cerium oxalate	lb.	0	4	6	to	0	4	9
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	6	0	to	0	6	6
Oxide, black	lb	0	9	6	to	0	10	0
Copper chloride	lb.	0	1	2	to	0	1	3
Sulphate	ton	26	10	0	to	27	0	0
Cream Tartar, 98–100%	ton	100	0	0	to	102	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol	ton	82	10	0	to	85	0	0
Formusol (Rongalite)	lb.	0	2	6	to	0	2	9
Glauber salts, commercial	ton	5	0	0	to	5	10	0
Glycerine, crude	ton	65	0	0	to	67	10	0
Hydrogen peroxide, 12 vols	gal.	0	2	4	to	0	2	5
Iron perchloride	ton	30	0	0	to	32	0	0
Iron sulphate (Copperas)	ton	3	10	0	to	4	0	0
Lead acetate, white	ton	43	0	0	to	45	0	0
Carbonate (White Lead)	ton	42	0	0	to	47	0	0
Nitrate	ton	44	10	0	to	45	0	0
Litharge	ton	35	10	0	to	36	0	0
Lithopone, 30%	ton	23	10	0	to	24	0	0
Magnesium chloride	ton	5	10	0	to	6	0	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	7	10	0	to	8	0	0
Sulphate (Druggists')	ton	11	0	0	to	11	10	0
Manganese Borate, commercial	ton	65	0	0	to	75	0	0
Sulphate	ton	60	0	0	to	62	0	0
Methyl acetone	ton	70	0	0	to	75	0	0
Alcohol, 1% acetone	ton	105	0	0	to	110	0	0
Nickel sulphate, single salt	ton	49	0	0	to	51	0	0
Ammonium sulphate, double salt	ton	51	0	0	to	52	0	0
Potash, Caustic	ton	32	0	0	to	33	0	0
Potassium bichromate	lb.	0	0	6	to		—	
Carbonate, 90%	ton	31	0	0	to	33	0	0
Chloride, 80%	ton	12	0	0	to	12	10	0
Chlorate	lb.	0	0	4½	to	0	0	5
Metabisulphite, 50–52%	ton	84	0	0	to	90	0	0
Nitrate, refined	ton	43	0	0	to	45	0	0
Permanganate	lb.	0	0	8½	to	0	0	9
Prussiate, red	lb.	0	4	6	to	0	4	9
Prussiate, yellow	lb.	0	1	6½	to	0	1	7½
Sulphate, 90%	ton	13	0	0	to	13	10	0
Salammoniac, firsts	cwt.	3	3	0	to		—	
Seconds	cwt.	3	0	0	to		—	
Sodium acetate	ton	24	10	0	to	24	15	0
Arseniate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	4½	to		—	
Bisulphite 60–62%	ton	21	0	0	to	23	0	0
Chlorate	lb.	0	0	3½	to	0	0	4
Caustic, 70%	ton	20	10	0	to	21	0	0
Caustic, 76%	ton	21	10	0	to	22	10	0
Hydrosulphite, powder, 85%	lb.	0	1	9	to	0	2	0
Hyposulphite, commercial	ton	11	0	0	to	12	0	0
Nitrite, 96–98%	ton	29	10	0	to	30	0	0
Phosphate, crystal	ton	16	0	0	to	16	10	0
Perborate	lb.	0	0	11	to	0	1	0
Prussiate	lb.	0	0	11½	to	0	1	0
Sulphide, crystals	ton	12	0	0	to	12	10	0
Sulphide, solid, 60–62%	ton	20	10	0	to	22	10	0
Sulphite, cryst	ton	12	10	0	to	13	0	0
Strontium carbonate	ton	55	0	0	to	60	0	0
trontium Nitrate	ton	40	0	0	to	42	0	0
Strontium Sulphate, white	ton	6	10	0	to	7	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Sulphur, Flowers	ton	11	0	0	to	12	0	0
Roll	ton	11	0	0	to	12	0	0
Tartar emetic	lb.	0	1	3	to	0	1	4
Theobromine	lb.	0	12	6	to	0	13	0
Tin perchloride, 33%	lb.	0	1	2	to	0	1	4
Perchloride, solid	lb.	0	1	5	to	0	1	7
Protochloride (tin crystals)	lb.	0	1	7	to	0	1	9
Zinc chloride 102° Tw	ton	21	0	0	to	22	10	0
Chloride, solid, 96–98%	ton	25	0	0	to	30	0	0
Oxide, 99%	ton	37	0	0	to	38	0	0
Dust, 90%	ton	45	0	0	to	47	10	0
Sulphate	ton	16	10	0	to	17	10	0

Coal Tar Intermediates, &c.

	Per	£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	2	3	to	0	2	6
Alphanaphthol, refined	lb.	0	3	0	to	0	3	3
Alphanaphthylamine	lb.	0	2	0	to	0	2	1
Aniline oil, drums extra	lb.	0	0	10	to	0	0	11
Aniline salts	lb.	0	0	11	to	0	1	0
Anthracene, 40–50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	3	6	to	0	4	0
Benzidine, base	lb.	0	5	0	to	0	5	3
Benzidine, sulphate	lb.	0	5	0	to	0	5	3
Benzoic acid	lb.	0	2	0	to	0	2	3
Benzoate of soda	lb.	0	2	0	to	0	2	3
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	0	5	3	to	0	5	6
Betanaphthol	lb.	0	1	4	to	0	1	4½
Betanaphthylamine, technical	lb.	0	5	0	to	0	5	6
Croceine Acid, 100% basis	lb.	0	3	6	to	0	3	9
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	2	9	to	0	3	0
Dinitrobenzol	lb.	0	1	3	to	0	1	4
Dinitrochlorbenzol	lb.	0	0	11	to	0	1	0
Dinitronaphthalene	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	5	to	0	1	6
Dinitrophenol	lb.	0	1	9	to	0	2	0
Dimethylaniline	lb.	0	2	6	to	0	2	9
Diphenylamine	lb.	0	4	3	to	0	4	6
H-Acid	lb.	0	6	0	to	0	6	3
Metaphenylenediamine	lb.	0	4	9	to	0	5	3
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	6	0	to	0	6	6½
Metatoluylenediamine	lb.	0	4	6	to	0	4	9
Monosulphonic Acid (2.7)	lb.	0	5	6	to	0	6	0
Naphthionic acid, crude	lb.	0	2	9	to	0	3	0
Naphthionate of Soda	lb.	0	3	0	to	0	3	3
Naphthylamin-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Neville Winther Acid	lb.	0	7	9	to	0	8	0
Nitrobenzol	lb.	0	0	9	to	0	0	9½
Nitronaphthalene	lb.	0	1	2	to	0	1	3
Nitrotoluol	lb.	0	1	0	to	0	1	2
Orthoamidophenol, base	lb.	0	12	0	to	0	12	6
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	1	6	to	0	1	9
Orthonitrotoluol	lb.	0	0	8	to	0	0	10
Para-amidophenol, base	lb.	0	9	0	to	0	9	6
Para-amidophenol, hydrochlor	lb.	0	8	6	to	0	9	0
Paradichlorbenzol	lb.	0	0	6	to	0	0	7
Paranitraniline	lb.	0	3	6	to	0	3	9
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	5	0	to	0	5	3
Paraphenylenediamine, distilled	lb.	0	10	6	to	0	10	9
Paratoluidine	lb.	0	6	0	to	0	6	6
Phthalic anhydride	lb.	0	2	9	to	0	3	0
Resorcin, technical	lb.	0	4	6	to	0	5	0
Resorcin, pure	lb.	0	6	0	to	0	6	3
Salol	lb.	0	2	0	to	0	2	3
Sulphanilic acid, crude	lb.	0	1	0	to	0	1	1
Tolidine, base	lb.	0	6	6	to	0	7	0
Tolidine, mixture	lb.	0	2	6	to	0	2	9

French Potash

IN their weekly market report, the Agricultural Information Bureau of the French Potash Mines state that potassic manures, more particularly Kainit and Sylvinite are now being quoted at prices which would have been thought almost impossible even in pre-war years, and that these prices prove all the more attractive since the standard of quality is higher. The present tendency is to buy potash because it is the cheapest fertiliser available. To those who are farming on light land an additional dressing of potash put on during the winter would certainly give a good return, and the benefits would last over several years, but generally where there is a shortage of farmyard manure it is considered that the combination of potash and phosphates with nitrogenous manure is the most economical manuring.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

GLASGOW, NOVEMBER 29, 1922.

BUSINESS during the past week has shown a slight improvement, but orders are still far from plentiful.

Prices are fairly steady with the exception of acetone, where the recent high prices have brought sellers on the market.

Continental quotations tend to be higher.

Industrial Chemicals

ACETONE.—Parcels offering at concessions in price. Business possible for forward arrival around £110 per ton.

ACID ACETIC.—Glacial, 98/100%, quoted for early delivery, £54 to £56 per ton; 80% pure, £42 to £43 per ton; 80% tech., £39 to £40 per ton; spot parcels at reasonable prices are scarce.

ACID BORACIC.—Crystal or granulated, £55 per ton; powdered, £57 per ton, carriage paid U.K. stations.

ACID FORMIC, 85%.—Price about £58 per ton.

ACID HYDROCHLORIC.—Makers' prices unchanged, 6s. 6d. per carboy, ex works.

ACID NITRIC, 84%.—About £27 10s. per ton, ex station, carboys extra.

ACID OXALIC.—Price about 7¼d. per lb.

ACID SULPHURIC.—144°, £4 per ton; 168°, £7 5s. per ton, ex works; de-arsenicated, £1 more.

ACID TARTARIC.—In little demand, 1s. 2d. to 1s. 2½d. per lb.

ALUM, CHROME.—Good inquiry, and early delivery hard to obtain. Quoted £27 per ton, f.o.b. U.K.

ALUM, LUMP POTASH.—English material about £13 per ton. Continental slightly cheaper.

ALUMINA SULHPATE.—English make, 14/15%, £10 15s. per ton; 17/18%, £11 15s. per ton. Continental lower.

AMMONIA CARBONATE.—Unchanged; lump, 4d. per lb.; ground, 4¼d. per lb., delivered.

AMMONIA, LIQUID, 880°.—3½d. per lb.; 940°, 1¾d. per lb., ex works.

AMMONIA MURIATE.—Grey galvanisers, £32 per ton, f.o.r.; fine white crystals quoted £26 15s. per ton, c.i.f. U.K.

AMMONIA SULPHATE.—25¼%, £15 per ton; 25¾%, £16 3s. per ton, ex works, November/December delivery.

ARSENIC, WHITE POWDERED.—Very scarce for spot delivery. Quoted £58 to £61 per ton, ex quay.

BARIUM, CHLORIDE, 98/100%.—Continental material £18 per ton, c.i.f. U.K.

BARYTES.—English make unchanged; finest white, £5 5s. per ton, ex works.

BLEACHING POWDER.—Unchanged, £12 15s. per ton, ex station. Continental, £10 per ton, c.i.f. U.K.

BORAX.—Crystal or granulated, £28 per ton; powdered, £29 per ton, carriage paid U.K. stations.

CALCIUM CHLORIDE.—English make, £6 per ton, ex quay or station. Continental offered at £3 17s. 6d., c.i.f. U.K.

COPPER SULPHATE.—Moderate export inquiry. Price about £26 per ton.

COPPERAS, GREEN.—Offered at £3 15s. to £3 17s. 6d. per ton, ex works.

FORMALDEHYDE, 40%.—Inclined to be scarce Price £81 to £83 per ton, ex wharf.

GLAUBER SALTS.—Fine white crystals, £4 5s. per ton. Offered from Continent at £3 per ton, c.i.f.

GLYCERIN.—1260 B.P. quality, £82 10s. per ton, ex store.

LEAD ACETATE.—White crystals, Continental material, £37 per ton, c.i.f. U.K.; red, £38 15s. per ton, in fair demand; white, £50 15s. per ton; Continental red lead about £34 per ton, ex store.

MAGNESITE, GROUND CALCINED.—£7 to £10, ex store.

MAGNESIUM CHLORIDE.—About £5 per ton, ex store, spot delivery. Continental offers of £3 5s. per ton, c.i.f. U.K.

MAGNESIUM SULPHATE (EPSOM SALTS).—Moderate export inquiry. Commercial, £6 per ton; B.P. quality, £7 2s. 6d. per ton, f.o.b.

NAPHTHALENE FLAKES.—Price about £12 per ton, ex works.

POTASSIUM BICHROMATE.—Unchanged, 6d. per lb., delivered.

POTASSIUM CARBONATE.—88/92%, £28 per ton, ex store, spot delivery; 96/98%, quoted £31 per ton, ex wharf.

POTASSIUM CAUSTIC, 88/92%.—Prices inclined to be higher. Quoted £30 per ton, spot delivery.

POTASSIUM CHLORATE.—Crystal or powdered, about 3½d. per lb.

POTASSIUM MURIATE.—Price about £10 per ton, basis 80%.

POTASSIUM NITRATE (SALTPETRE).—In little demand, £32 per ton (nominal).

POTASSIUM PERMANGANATE.—Commercial, about 7¼d. per lb.; B.P. quality, 8d. per lb.

POTASSIUM PRUSSIATE, YELLOW.—Unchanged at 1s. 6½d. per lb.

POTASSIUM SULPHATE, 90%.—Offered at £13 10s. per ton, ex wharf.

SODIUM ACETATE.—Price unchanged at about £23 per ton.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station; mineral water quality, £1 less.

SODIUM BICHROMATE.—Unchanged, 4½d. per lb., delivered.

SODIUM CARBONATE.—Soda crystals, £5 10s. to £5 15s. per ton, ex quay or station. Alkali, 58%, £9 2s. 6d. per ton, ex quay or station.

SODIUM CAUSTIC.—76/77%, £23 5s. per ton; 70/72%, £21 5s. per ton; 60/62%, £20 5s. per ton; 98/99% powdered, £26 15s. to £27 15s. per ton, ex station; caustic bottoms, £11 per ton, ex store.

SODIUM HYPOSULPHITE.—Commercial, £11 5s. per ton, ex store; pea crystals, £17 per ton.

SODIUM NITRATE, 96/98%.—Refined quality £12 10s. per ton.

SODIUM PRUSSIATE, YELLOW.—Quoted 11½d. to 11¾d. per lb.

SODIUM SULPHATE (SALTCAKE 95%).—Price for home consumption £4 per ton on contract. Good export inquiry.

SODIUM SULPHIDE, 60/62%.—Continental offers of £14 10s. per ton, c.i.f. U.K.

SULPHUR.—Government surplus stocks of Sicilian Thirds available at £3 10s. to £3 15s. per ton, ex depot. Flowers, £11 per ton; roll, £10 per ton; rock, £9 per ton; ground, £9 per ton. Prices nominal.

TIN CRYSTALS.—Unchanged at 1s. 2d. per lb.

ZINC CHLORIDE, 98/100%.—White powder offered at £20 per ton, c.i.f., U.K.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ALPHA NAPHTHOL.—Export inquiry. Price quoted, 2s. 9d. per lb., f.o.b.

ALPHA NAPHTHYLAMINE.—Export inquiry. Price quoted, 1s. 9d. per lb., f.o.b.

BETA OXY NAPHTHOIC ACID.—Home inquiry. Price quoted, 10s. per lb., delivered.

CRESIDINE.—Home inquiry. Price quoted, 13s. 6d. per lb., delivered.

"G" SALT.—Export inquiry. Price 3s. 3d. per lb., 100% basis, f.o.b.

"H" ACID.—Price inclined to be lower; at 5s. 6d. per lb., 100% basis.

METAPHENYLENEDIAMINE.—Export inquiry. Price quoted, 5s. 6d. per lb., f.o.b.

NAPHTHIONATE OF SODA.—Export inquiry. Price, 2s. 8½d. per lb., 100% basis, f.o.b.

ORTHO TOLUIDINE.—Export inquiry. Price quoted, 1s. 5d. per lb., f.o.b., drums included.

PARANITRANILINE.—Export inquiry. Price quoted, 3s. per lb., f.o.b.

PHTHALIC ANHYDRIDE.—Home inquiry. Price quoted, 2s. 6d. per lb., delivered.

"R" SALT.—Home and export inquiries. Price quoted, 2s. 5d. per lb., 100% basis, carriage paid, or f.o.b.

"R. R." ACID.—Home inquiry. Price quoted, 15s. 9d. per lb., 100% basis, carriage paid.

The Manchester Chemical Market

FROM OUR OWN CORRESPONDENT.

Manchester, November 30, 1922.

THE chemical market has recovered somewhat from the dullness which characterised it a week ago, and a brighter tone prevails generally. There is no lack of inquiry either for home or foreign consumers, and in the aggregate a fair volume of trade is being done, though individual parcels, as a rule, are rather small, buyers proceeding very cautiously. Chemical traders here are receiving quite a number of inquiries for delivery over next year. In the meantime prices keep very firm, a feature of the market being the rapid advance in the quotation for arsenic.

Heavy Chemi als

Caustic soda is in better demand for home consumers, and foreign shipments also continue on a fairly satisfactory scale; quotations are unchanged at £21 per ton for 70 per cent. strength, and £23 for 76 per cent. Bleaching powder is quite firm at £12 to £12 10s. per ton, in softwood casks, without any very great demand. Soda crystals keep steady at £5 12s. per ton delivered, good quantities being taken up. Saltcake is rather quieter, though prices are very firm at £4 10s. per ton. Glauber salts are improving and the price is steady at £4 10s. per ton. Sodium sulphide is still a quiet section of the market, with offers at £17 10s. for 60-65 per cent. concentrated, and Continental supplies at lower rates; crystals are unchanged at £11 per ton. Ammonia alkali is moderately active at £7 17s. 6d. per ton for 58 per cent. material. Bicarbonate of soda keeps very steady at £10 10s. per ton, in 2-cwt. bags, carriage paid. Hyposulphite of soda meets with little demand, and prices are on the easy side, with £18 quoted for photographic crystals, and £10 10s. per ton for commercial. With a steady demand and supplies short for spot nitrate of soda is well maintained at £28 per ton. Phosphate of soda is quiet at about £15 per ton. Prussiate of soda is easier at 10½d. to 10¾d. per lb. Chlorate of soda is quiet but steady at 2¾d. per lb., with Continental makes on offer. Bichromate of soda is also steady and in fair demand at 4½d. per lb. delivered. Acetate of soda is rather less active at £23 per ton.

Caustic potash is steady at £28 per ton for 88-90 per cent. strength, but there is only a moderate demand. Bichromate of potash is in rather better inquiry at 6d. per lb. Yellow prussiate of potash continues scarce for spot delivery, and price is firm at 1s. 6d. per lb.; red, 4s. 3d. Carbonate of potash is still active at £28 10s. to £29 per ton for 96-98 per cent. material. Chlorate of potash meets with a very restricted inquiry and the price is weaker at 3½d. per lb. Permanganate of potash is steady and in moderate request at 7d. to 7½. per lb.

A slightly improved tone in the position of sulphate of copper is reported, and foreign inquiries are still very numerous; the price is firm at £26 to £27 per ton, f.o.b. Arsenic, owing to continued scarcity and active demand, is rapidly climbing, and for white powdered, Cornish makes, £60 per ton and upwards is being asked here for any spot lots that are available. Commercial Epsom salts are quoted at about £6 per ton, but business is not very good. Acetate of lime remains scarce for spot delivery, with grey quoted at £15 10s., and brown £8 10s. per ton. Nitrate of lead is offered at £42 to £43 per ton, without, however, arousing much interest. White sugar of lead is also quiet at £37, with brown quoted at £34 per ton. Ammonium muriate is easier at about £32 for grey and £38 per ton for white. Alum is quiet but unchanged at £13 10s. per ton for loose lump, delivered.

Acids and Tar Products

No improvement can be reported in the position of tartaric and citric acids, buyers showing little interest in either of these products; tartaric is quoted at 1s. 2d., and citric at 1s. 9d. per lb. for B.P. crystals. Acetic acid meets with a continued good inquiry and offers are firm at £65 for glacial, and £40 per ton for 80 per cent. technical. Oxalic acid is almost neglected, and 6¾d. to 7d. per lb. is the range of prices now mentioned. Crystallised boracic acid is unchanged at £55 per ton.

With supplies short and a steady export demand pitch is firm at about £6 per ton, f.o.b. Manchester. Carbolic acid crystals are now finding a good market, particularly for export, and the price is up to 8d. to 8¼d. per lb. Crude carbolic acid is also meeting with an improved demand at 2s. 3d. to 2s. 6d. per gallon for 60 per cent. material. Benzole is featureless at 1s. 8d. per gallon. Solvent naphtha remains quiet at 1s. 10d. per gallon for 90-160. Creosote oil is in better demand for shipment at 7d. per gallon. Naphthalene is still quoted at up to £7 per ton for crude, £17 for flake, and £15 per ton for crystals, with a moderate inquiry for most grades.

Chemical and Metallurgical Corporation

Exploitation of the Elmore Process

PRESIDING on November 24, at the second annual meeting of the Chemical and Metallurgical Corporation, Mr. Herbert Guedalla said they had taken a small interest in the Diehl process for the recovery of zinc, lead and silver from zinciferous ores or zinciferous slags from lead or copper smelting furnaces, of which large accumulations exist in various parts of the world. Large scale tests extending over several weeks had been carried out under the most minute supervision of experts on more than 5,000 tons of the material and a full sized working plant, with the most satisfactory results. Experts thought very highly of this process, and negotiations were now being conducted with a view to the formation of a company for the commercial development of this important metallurgical invention. One other small investment concerned a gas-pressure regulator. The installations on the Continent had produced the economical results which have been claimed for them, and in normal times the installation of these small plants in this country would doubtless appeal to the works to which they could be of use.

Dealing with the Elmore process, Mr. Guedalla said its exploitation from the technical side had made considerable and satisfactory progress, and the unavoidable delays had been utilised in their experimental works in improving the different items of plant with great success. In several directions notable improvements had been made in the process in order to make its application easier in widely different conditions, both climatic and metallurgical, and also in the direction of simplification of operation, and a long step had been taken in rendering the plant almost automatic so far as some of the important stages were concerned. The possibility of the utilisation of some of the by-products had received careful attention, and this might prove to be of great value in the process. During the year negotiations had been proceeding with the Burma Corporation. They had arrived at an agreement with the Burma and the Zinc Corporation, under which the process would be tried out in this country on a commercial scale, in fact, on such a scale as would satisfy their engineers.

For this purpose they had taken on very reasonable terms a site at Stratford, and had a satisfactory agreement with their neighbours for the supply of acid and other facilities, which would save them a very large initial outlay. The work on this plant was proceeding as quickly as possible, and it was being directed by a committee on which both the Burma Corporation and the Zinc Corporation were represented. If all went well they trusted, in the course of the next few months, to begin these large scale tests, which their technical advisers looked forward to with the utmost confidence. There was a possibility that after these tests have been completed these works could be expanded into an important profit-earning plant. During the year the process had been seen at work by a number of the most eminent metallurgists, and he thought that in every case they had given favourable opinions.

Death of Mr. H. J. Powell

WE regret to record the death, on November 26, at 80, Alleyn Road, Dulwich, of Mr. Harry James Powell, who was connected for forty-six years with James Powell and Sons (Whitefriars), Ltd., glass manufacturers, of Whitefriars Glass Works, Tudor Street, London. Born in 1853, he was the eldest surviving son of Mr. Nathaniel Powell, of Buckhurst Hill, Essex. Mr. Powell, who retired in 1919, was awarded the O.B.E. for his services in the war, when he manufactured many special glasses for clinical and high-temperature thermometers, X-ray bulbs, and glass for the projecting horns of marine mines. The interment, at St. James', Gerrard's Cross, was preceded on Wednesday by a funeral service at St. Barnabas Church, Dulwich.

Company News

SWEDISH MATCH CO.—In regard to the offer for sale of 179,500 shares of 100 Swedish Crowns each in the company, which was heavily over-subscribed, it is announced that letters of acceptance and regret were posted on Tuesday.

AMALGAMATED PHOTOGRAPHIC MANUFACTURERS, LTD.—Mr. Justice Russell, on Tuesday, sanctioned a petition for the reduction of the capital from £1,100,000 to £930,000, to cover losses and other sums not represented by the available assets.

BRITISH COTTON AND WOOL DYERS.—The interim half yearly report shows £63,248 net profit, against £21,000 loss a year ago. The latter was due mainly to writing down stock, and was extinguished by the sum brought forward. The last full year's profit was nearly £125,000, a dividend of 10 per cent. was paid, and over £28,000 carried forward.

ILFORD, LTD.—After making allowance for depreciation and provision for doubtful debts, etc., the net profit for the year to October 31 was £52,235, and £6,281 was brought in, making £58,516. The directors transfer £4,000 to reserve, write £10,000 off goodwill, and recommend a dividend of 8 per cent on the ordinary shares for the year, leaving to be carried forward £8,316. Warrants will be posted on December 6. The annual meeting will be held at Winchester House, London, on December 6, at noon.

BRITISH BROKEN HILL PROPRIETARY CO.—In connection with the negotiations referred to in THE CHEMICAL AGE last week, further advices from Melbourne state that arrangements are being made for the sale of the British company to a new company with head offices at Adelaide. The capital of the new company, it is unofficially stated, will be £750,000 in shares of £1, of which 375,000 will be allotted to shareholders and 150,000 will be underwritten, the balance being held in reserve. Proposals are being made to pay off the present shareholders, partly in shares and cash, or wholly in cash at 35s. per share.

ANGLO-BURMA OIL CO., LTD.—Following on a meeting of the shareholders held last week, it is stated that efforts are being made to reorganise the affairs of this company. It is also announced that the whole of the original board has retired and new directors are being appointed by the shareholders. An issue of £60,000 10 per cent. five-year notes—part of an authorised issue of £100,000—is being made to the shareholders at the price of 98, repayable at par on October 1, 1927. The new board so far appointed includes Mr. A. H. Tucker, the original owner of the Indian properties, Sir Cecil Beck and Mr. T. W. Richards.

W. H. DORMAN AND CO., LTD.—At the adjourned meeting of the holders of the 8 per cent. seven-year notes, held on November 24, a resolution authorising the creation and issue of debenture stock to a total nominal amount not exceeding £150,000, and bearing a rate of interest not exceeding 10 per cent., was carried, after some discussion, with one dissentient. The chairman said that, subject to the consent of the bank, it was possible that some arrangement would be made whereby the noteholders, in consideration of subscribing a certain proportion of the proposed debenture issue, would be permitted to exchange their notes for debentures.

CASTNER-KELLNER ALKALI.—For the year to September 30 last the net profit was £249,224, and £13,706 was brought in, making a total of £262,930. From this has to be deducted debenture interest, £7,436, and the interim dividend paid in May last, £80,000, leaving an available balance of £175,494. The directors recommend a further division of 12 per cent. (£120,000), making 20 per cent. for the year, payable on December 7, which will leave £55,494 to be carried forward. A resolution for altering certain of the Articles of Association is to be submitted. The annual meeting will be held at 7, Cavendish Square, London, W., on December 7, at noon.

PAN DE AZUCAR NITRATE CO.—For the year to June 30 last the gross profit, including interest on investments and transfer fees, amounts to £34,070. From this have to be deducted, London expenses, £2,477; reserves for taxation, £7,200; insurance reserve, £300; and interest and discount, £32, leaving a net profit of £24,061, which with £32,088 leaves an available balance of £56,149. After paying the recommended dividend of 15 per cent., less tax, £44,393 remains to be carried forward. There was a stock of 181,422 Spanish quintals of manufactured nitrate at the oficina at June 30. last. Practically the whole of this stock has since been sold. The manufacture of nitrate has been suspended throughout the year and the profits shown were realised from stocks brought in from the previous year. The annual meeting was held yesterday (Friday) at Winchester House, London, E.C.

LONDON NITRATE CO.—The profit on the trading for the year to June 30 last, after deducting depreciations and adding transfer fees, was £35,113, plus £20,730 brought in. Office expenses, taxation, debenture and other interest absorb £22,875, and the payment of a dividend of 1s. 6d. per share, free of tax payable December 1, leaves a balance to be carried forward of £17,968. The report adds that manufacture has been suspended in all the company's oficinas for the whole year, and that the stocks carried forward from June 30, 1921, are now practically exhausted. The oficina "Santa Laura" was restarted in August to provide the balance of the estimated quota of sales for the current year, and production has proceeded steadily since. Oficinas "Transito" and "Puntunchara" remain closed. The directors consider the time has arrived to complete the installation at "Santa Laura," and contracts are now being entered into to bring the oficina up to the capacity originally planned. The annual meeting will be held at Common Hall, Hackins Hey, Liverpool, on December 7, at noon.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIAL.	REF. NO.
Switzerland ..	Technical and pharmaceutical chemicals.	—
Canada	Spruce gum, hard and soft.	—

Tariff Changes

AUSTRIA.—Laws of July 24 and October 26 provide for the levy, as from October 9, of a tax on acetic acid produced in Austria by other means than fermentation, for the table, and on acetic acid and vinegar imported into Austria. The rate of the tax is at present fixed at 1,500 kronen per kilog of anhydrous acid. As from November 9 magnesite is subject to an export duty of 0·60 kronen (gold) per 100 kilogs.

DENMARK.—Modifications in the import duties on spirituous extracts and essences, perfumes, etc., were given in the *Board of Trade Journal* of November 23 (p. 595).

Brochure on Science

IN issuing an interesting booklet under the above title, F. Hulse and Co., Ltd., manufacturers of chemicals and intermediates, of Woodlesford, near Leeds, state that the principal purpose of the brochure is to inculcate a spirit of service of science in Britain, to correct popular fallacies, and to show, in a small way, what science really is. In a foreword, Dr. H. H. Hodgson emphasises the fundamental necessity of the existence in this country of a soundly established organic chemical industry, and deals with the relationship between the business and technical sides of the industry. Pointing out that a profit cannot be made on something as yet technically undiscovered, he asserts that the business man will have to realise that it is not just a matter of dumping down a sum of money and demanding the commercial production of chemicals of great complexity within a given time limit. While of the best in quality, our capable research chemists are relatively few in number, and their ranks can only be increased, states Dr. Hodgson, by a process which is painfully slow and beset with many more obstacles than attend the make-up of the successful business man.

The booklet also contains some stimulating articles emphasising the importance of science, and the cover bears an attractive impression in colours of the canal side of Messrs. Hulse's works.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

ALLKINS, Mr. W. H., Rexall Pharmacy, Coulsden, chemist. (C.C., 2/12/22.) £10 10s. 10d. September 26.

PHILLIPPS, Miss Elsie J., 668, Fishponds Road, Bristol, chemist. (C.C., 2/12/22.) £13 12s. 11d. October 6.

RHEINLANDER, Frances Christina (spinster), 48, Clifford Street, Chorlton-on-Medlock, drug store keeper. (C.C., 2/12/22.) £21 16s. 11d. October 19.

RUSSELL, Mr. G. H., 33, High Road, Willesden Green, chemist. (C.C., 2/12/22.) £13 1s. 4d. October 12.

SIMONS (a firm), 9, West Derby Street, Liverpool, cash chemists. (C.C., 2/12/22.) £13 19s. 5d. October 9.

TREWBY, H., Kumra Lodge, Kelvedon Hatch, wholesale chemist. (C.C., 2/12/22.) £38 8s. 3d. October 14.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

BALME AND PRITCHARD, LTD., Halifax, dyers. (M., 2/12/22.) Registered November 13, debenture, to bank; charged on property as described in debenture with fixtures, etc., also general charge. *£21,400. June 6, 1921.

MANCHESTER OIL REFINERS, LTD. (M., 2/12/22.) Registered November 14, £200 further charge; charged on 14, Cornbrook Park Road, and 353, Chester Road, Stretford. *£525. December 31, 1921.

PRECIOUS (HAROLD), LTD., Bradford, dyers. (M., 2/12/22.) Registered November 15, £500 mortgage; charged on 12, Church Lane, Pudsey. *Nil. May 12, 1921.

WALKERS PAINTS, LTD., London, S.W. (M., 2/12/22.) Registered November 16, £400 (not ex.) debentures, to bank; charged on 59, Wandsworth Road.

Satisfaction

HULL OIL MANUFACTURING CO., LTD. (M.S., 2/12/22.) Satisfaction registered November 16, all moneys, etc., and £75,000, registered September 3, 1914.

London Gazette

Companies Winding-Up Voluntarily

BRITISH ALBERTA OIL CO., LTD. (C.W.U.V., 2/12/22.) H. C. Chambers, 6, Bennett's Hill, Birmingham, appointed liquidator. Meeting of creditors at 6, Bennett's Hill, Birmingham, on Thursday, December 7, 1922, at 3 p.m.

BRITISH SULPHUR CO., LTD. (C.W.U.V., 2/12/22.) W. Weir, 1, London Wall Buildings, E.C., appointed liquidator. Meeting of creditors at 1, London Wall Buildings, London, on Monday, December 4, 1922, at twelve o'clock noon.

Bankruptcy Information

MORGAN, Christopher William, and MORGAN, Florence Ellen (his Wife), 38, Whitford Gardens, Mitcham, Surrey, paint and varnish merchants. (R.O., 2/12/22.) Receiving order, November 21. Creditor's petition.

WILSON, Stewart, Burnham Market, Norfolk, chemist and druggist. (R.O., 2/12/22.) Receiving order, November 21. Creditor's petition.

Notices of Intended Dividends

BUSH, Emil Frederick, 120, High Road, New Southgate, colour and chemical merchant. Last day for receiving proofs, December 9. Trustee, F. W. Davis (of the firm of Saker and Davis), 28, Theobalds Road, London, W.C.1.

JOHNSON, Joseph Melbourne, High Street, Upton-on-Severn, Worcester, chemist. Last day for receiving proofs, December 14. Trustee, T. Easton, Official Receiver, Ruskin Chambers, 191, Corporation Street, Birmingham.

Notices of Dividends

CHAMBERS, John, 78, Belle Vue Road, Leeds, chemist. Amount per £, 6s. 3½d. Supplemental. Payable December 5, Official Receiver's Office, 26, Baldwin Street, Bristol.

ROBINSON, Wilson, ROBINSON, Tom, and WIGHTMAN, James, carrying on business under the style of WILSON ROBINSON AND SON, Albion Dyeworks, Batley Carr, Batley, York, dyers. Amount per £, 1⅛d. Supplemental. Payable December 8, Official Receiver's Office, 12, Duke Street, Bradford.

Partnership Dissolved

THORLEY'S DETERGENT CO. (Harry TURLEY and William WHITTER), detergent manufacturers, South Docks, Sunderland, by mutual consent as from September 18, 1922, so far as concerns W. Whitter, who retires from the said firm. Debts received and paid by Harry Turley, who will continue the business.

New Companies Registered

ALSPA, LTD., 648, Salisbury House, London Wall, E.C. Manufacturing chemists. Nominal capital, £1,000 in £1 shares.

C. A. BROWNE (SOUTHCROFT), LTD., 270, Mitcham Lane, Streatham, S.W. Chemists, druggists, drysalters, oil and colourmen, etc. Nominal capital, £500 in 10s. shares.

CELLULOID (BERNE), LTD., 15, Coleman Street, London, E.C.4. Manufacturers of and dealers in celluloid, xylonite, lactoid, vulcanite, etc. Nominal capital, £100 in 1s. shares.

GWALIA MANUFACTURING CO., LTD., 28 Walcot Street, Bath. Manufacturers of soap and cleansing materials and dealers in all kinds of oils, dyestuffs, toilet and chemical requisites, etc. Nominal capital, £1,000 in £1 shares.

HAZARD GODCHAUX DYES CHEMICALS, LTD., Walter House, 422, Strand, W.C. Manufacturers of and dealers in dyestuffs, dyeware, colours, pigments, varnishes, etc. Nominal capital, £10,000 in £1 shares.

SAMUEL JACKSON (ROCHDALE), LTD. Manufacturing chemists, oil refiners, etc. Nominal capital, £3,000 in £1 shares. A director: S. Jackson, 158, Ramsden Road, Wardle, Rochdale.

Chemical Trade Wages

Proposed Reductions in Fine and Heavy Branches

On November 24, at the Ministry of Labour, the Joint Industrial Council for the Chemical Trade had under consideration a claim by the employers in the heavy chemical trades for a reduction in wages from December 31 of 1d. per hour in the case of time workers, 1½d. for shift workers, with a ½d. per hour reduction for those below 18 years of age, and proportionate reduction for piece workers. After a long discussion the proposal was adjourned until a further meeting of the Council late in December.

Approximately 8,000 workers in the drug and fine chemical industry, chiefly employed in London, Liverpool, Manchester, Edinburgh, York, Hull, Leeds, Bristol, and Nottingham, are concerned in a wage dispute upon which it is proposed to take a strike ballot. The agreement, which expired at the end of last year, has not been renewed, although the seven unions concerned state that they have several times endeavoured to effect a settlement with the Manufacturers' Association. An official of the workers' side informed a Press representative that the employers, who have given notice to put a new wages scale into operation on the first pay day in December, have refused to meet the trade union representatives to discuss the matter. The proposed reductions are said to range, according to class and age, from 1s. to 13s. per week.